DOCUMENT RESUME

ED 467 329 HE 035 126

AUTHOR	Wei, Christina Chang; Horn, Laura
TITLE	Persistence and Attainment of Beginning Students with Pell Grants. Postsecondary Education Descriptive Analysis Reports.
INSTITUTION	National Center for Education Statistics (ED), Washington, DC.; MPR Associates, Berkeley, CA.
REPORT NO	NCES-2002-169
PUB DATE	2002-05-00
NOTE	84p.; Project Officer, C. Dennis Carroll.
AVAILABLE FROM	ED Pubs, P.O. Box 1398, Jessup, MD 20794-1398. Tel: 877-433-7827 (Toll Free); Fax: 301-470-1244; e-mail: edpubs@inet.ed.gov.
PUB TYPE	Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC04 Plus Postage.
DESCRIPTORS	*Academic Persistence; *College Students; *Educational Attainment; Federal Aid; Higher Education; *Student Financial Aid
IDENTIFIERS	*Pell Grant Program

ABSTRACT

The Pell grant program is the largest federal need-based grant program available to postsecondary education students. This report provides a description of Pell Grant recipients who were first-time beginning postsecondary students in the 1995-1996 academic year. Using data from the 1996 Beginning Postsecondary Students Longitudinal Study First Followup, the report examines the academic and enrollment characteristics of beginning students who received a Pell Grant and their rates of persistence 3 years after starting postsecondary education. These students are compared with beginning students who did not receive a Pell Grant, but high-income students were excluded from this comparison because most Pell Grant recipients are low-income students. In the 1995-1996 school year, 29% of all beginning students and 32% of full-time beginning students received a Pell Grant. When only low- and middle-income students were considered, Pell Grant recipients differed from nonrecipients in their level of high school academic preparation and the number of factors that put them at risk of not achieving their academic objectives. Before any background variables were taken into account, among all full-time low- and middle-income beginning students enrolled at all postsecondary institutions, Pell Grant recipients were less likely to remain enrolled than their nonrecipient counterparts, but the findings from multivariate analysis showed that no differences in persistence could be detected after controlling for the covariation of related variables. One appendix contains a glossary, and the other contains technical notes and a description of the survey methodology. (Contains 22 tables, 5 figures, and 12 references.) (SLD)

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Persistence and Attainment of Beginning Students With Pell Grants

Postsecondary Education Descriptive Analysis Reports

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Persistence and Attainment of Beginning Students With Pell Grants

Postsecondary Education Descriptive Analysis Reports

May 2002

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Suggested Citation

U.S. Department of Education, National Center for Education Statistics (2002). *Persistence and Attainment of Beginning Students With Pell Grants,* NCES 2002-169, by Christina Chang Wei and Laura Horn. Project Officer: C. Dennis Carroll. Washington, DC: 2002.

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Executive Summary

The Pell Grant program is the largest federal need-based grant program available to postsecondary education students. In 1998–99, the federal government spent $7.2 billion on Pell Grants for more than 3.8 million students (U.S. Department of Education 1999). Students can use a Pell Grant at almost all 2- and 4-year public and private not-for-profit institutions, as well as several thousand private for-profit institutions. Pell Grant program eligibility is based primarily on the student's and/or parents' income for the previous year, with awards made primarily to low-income students. Among undergraduates who enrolled in postsecondary education for the first time in 1995–96, 87 percent of Pell Grant recipients were either dependent students whose parents' incomes were under $45,000 (59 percent) or independent students with incomes under $25,000 (28 percent). Other factors are also taken into account in awarding Pell Grants, such as student and parent assets and other family members who are concurrently enrolled in college.

This report provides a description of Pell Grant recipients who were first-time beginning postsecondary students in 1995–96. Using data from the 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98), the report examines the academic and enrollment characteristics of beginning students who received a Pell Grant and their rates of persistence 3 years after first starting postsecondary education. These students are compared with beginning students who did not receive a Pell Grant. Because Pell Grant recipients are predominantly low-income students, high-income students were excluded from the analysis when comparing students' educational background and postsecondary outcomes. For these analyses Pell Grant recipients were only compared to low- and middle-income nonrecipients. However, all students were included when analyzing the distribution of different types of financial aid and the types of institutions that students attended with respect to whether or not they received a Pell Grant.

In 1995–96, 29 percent of all beginning students and 32 percent of full-time beginning students received a Pell Grant. Beginning postsecondary students receiving Pell Grants differed from other first-time students in the types of institutions attended and receipt of other types of financial aid. When examining low- and middle-income students only, Pell Grant recipients differed from nonrecipients in their level of high school academic preparation and the number of factors that put them at risk for not achieving their educational objectives.

Institution Type, Pell Grant Award Amounts, and Other Financial Aid

Taking into account all students who enrolled in postsecondary education for the first time in 1995–96, Pell Grant recipients differed from nonrecipients in where they enrolled. In particular, they were more likely than nonrecipients to attend private for-profit less-than-4-year institutions, which provide primarily short-term occupational training. Pell Grant recipients were less likely than nonrecipients to attend public 4-year, public 2-year, and private not-for-profit 4-year institutions

Table A.—Percentage distribution of all 1995–96 beginning postsecondary students according to first institution type, by receipt of Pell Grant and attendance status

Receipt of Pell Grant	Public 4-year	Private not-for-profit 4-year	Public 2-year	Private for-profit less-than-4-year	Other*
			Total		
Total	25.9	14.7	45.7	10.6	3.1
Pell recipient	23.5	12.7	38.8	20.6	4.4
Nonrecipient	26.9	15.7	48.3	6.4	2.6
			Full-time students		
Total	32.3	19.1	32.6	12.6	3.4
Pell recipient	26.1	14.8	32.5	22.1	4.6
Nonrecipient	35.3	21.2	32.7	8.0	2.8

*Other institutions include public less-than-2-year institutions, private not-for-profit less-than-4-year institutions, and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

(table A). Differences in enrollment patterns were also notable among full-time students, with 26 percent of Pell Grant recipients attending public 4-year institutions and 22 percent attending private for-profit less-than-4-year institutions. In contrast, 35 percent of full-time nonrecipients attended public 4-year institutions and 8 percent attended private for-profit less-than-4-year institutions.

Because Pell Grant recipients are primarily low-income students, they were more likely than nonrecipients to qualify for and receive additional types of financial aid such as loans, work-study, and other grant aid. Among Pell Grant recipients, those enrolled at private not-for-profit 4-year institutions were more likely than those at other institutions to receive other financial aid.

Academic Background and Enrollment Characteristics

Taking into account low- and middle-income students only, Pell Grant recipients were less well prepared academically than their counterparts who did not receive a Pell Grant. Among students enrolled at 4-year institutions, Pell Grant recipients were more likely than nonrecipients to have SAT I (or equivalent ACT) scores that fell in the lowest quartile and less likely to have completed a rigorous curriculum while in high school. Those attending less-than-4-year institutions were less likely than nonrecipients to have received a high school diploma (i.e., they did not graduate or they finished high school with a GED or high school completion certificate).

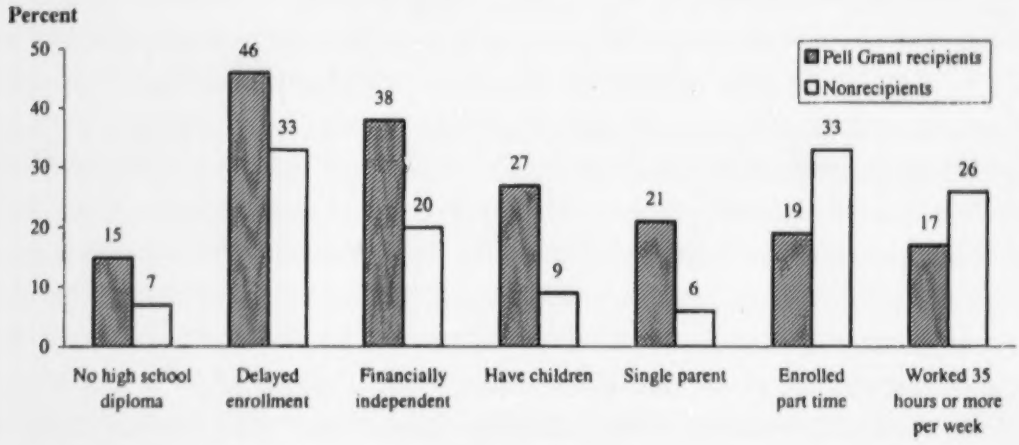
Low- and middle-income Pell Grant recipients attending less-than-4-year institutions differed in some respects from nonrecipients in their educational objectives. Recipients at public 2-year institutions were more likely than nonrecipients to be pursuing an associate's degree and less likely to be working toward a vocational certificate. Pell Grant recipients enrolled at private for-profit less-than-4-year institutions were more likely than nonrecipients to be pursuing *no* degree and less likely to be pursuing a vocational certificate.

Pell Grant recipients enrolled at public 2-year institutions also were more likely than nonrecipients to enroll full time and less likely to work while enrolled. This may be due in part to the Pell Grant program's requirements. Both part-time attendance and income earned from employment can decrease eligibility for a Pell Grant.

Persistence Risk Factors

Seven characteristics have been shown to be associated with leaving postsecondary education without a degree (Horn and Premo 1995): not graduating from high school (or finishing with a GED or high school completion certificate), delaying enrollment in postsecondary education, being financially independent (i.e., for financial aid purposes), having dependents other than one's spouse, being a single parent, attending part time, and working full time while enrolled. Among low- and middle-income beginning students, Pell Grant recipients were more likely than nonrecipients to have each of these persistence risk factors except for full-time employment and part-time enrollment (figure A). Recipients also had a higher average number of risk factors than did nonrecipients. Recipients' likelihood of having such factors varied

Figure A.—Percentage of 1995–96 low- and middle-income beginning postsecondary students with persistence risk factors, by receipt of Pell Grant



NOTE: Low- and middle-income students include all dependent students whose parents had an annual income in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

by institution type, with those at less-than-4-year institutions more likely than those at 4-year institutions to be at risk. Within each institution type, however, Pell Grant recipients were more likely than nonrecipients to be independent, to have children, and to be single parents.

Three-Year Rates of Persistence

Examination of 3-year rates of persistence included comparisons of students by institution type and academic background, comparisons of Pell Grant recipients by receipt of other financial aid or parental support, and a multivariate analysis taking into account several variables associated with persistence.

The 3-year persistence rates of Pell Grant recipients initially enrolled at 4-year institutions and those enrolled at less-than-4-year institutions were examined separately to account for differences in the academic preparation and educational goals of students at different types of institutions. Because Pell Grant recipients were less well prepared academically and reported more persistence risk factors than nonrecipients, it might be expected that Pell Grant recipients would have lower rates of persistence and attainment than nonrecipients. However, with a few exceptions this appeared in large part not to be observed in this study.

Persistence at 4-Year Institutions

Considering all low- and middle-income beginning students who were enrolled at 4-year institutions in 1995–96, no differences in 3-year persistence rates were detected between Pell Grant recipients and nonrecipients. Furthermore, with one exception, no differences were detected in persistence between Pell recipients and nonrecipients when taking into account either SAT I/ACT composite test scores (table B) or high school curriculum (table C). The exception was for those who scored in the lowest SAT I/ACT quartile (table B): Pell grant recipients were *less* likely than nonrecipients to leave postsecondary education without a degree (16 versus 26 percent).

Private Not-For-Profit 4-Year Institutions

When examining low- and middle-income students in 4-year institutions separately within sector, some differences were observed among students enrolled at private not-for-profit institutions. Specifically, among those who had completed a mid-level high school academic curriculum, nonrecipients were more likely than Pell Grant recipients to remain enrolled at an institution of the same level or higher (64 versus 80 percent). Among those who had taken a rigorous high school curriculum, however, no differences in persistence rates were detected between recipients and nonrecipients (89 percent for both groups).

Public 4-Year Institutions

Among low- and middle-income beginning students enrolled at public 4-year institutions, differences were found among students scoring in the lowest and middle quartiles on their entrance exams: Among those scoring in the lowest quartile, Pell Grant recipients were less likely to leave without a degree (15 versus 28 percent), while among those scoring in the middle quartiles, Pell Grant recipients were more likely to leave without a degree (17 versus 12 percent). However, in neither of these test score groups (lowest or middle quartiles) were differences detected in the likelihood of remaining enrolled at an institution of the same level or higher.

Table B.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and SAT I/ACT composite score

Receipt of Pell Grant	Remained enrolled at same or higher level institution in spring 1998[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total in public and private not-for-profit 4-year institutions	
Total	65.0	20.2	14.8
Pell recipient	62.9	20.9	16.2
Nonrecipient	66.1	19.9	14.0
		Low quartile (400–700)	
Total	51.9	27.8	20.4
Pell recipient	53.7	30.8	15.5
Nonrecipient	49.9	24.5	25.6
		Middle quartiles (710–1020)	
Total	64.0	22.4	13.6
Pell recipient	63.2	21.4	15.4
Nonrecipient	64.4	23.0	12.6
		High quartile (1030–1600)	
Total	79.0	13.1	7.9
Pell recipient	81.2	10.5	8.3
Nonrecipient	78.3	13.9	7.8

[1]Percentage who were continuously enrolled or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, in combination with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Persistence at Less-Than-4-Year Institutions

Among low- and middle-income students enrolled at less-than-4-year institutions, Pell Grant recipients averaged more persistence risk factors than nonrecipients and were less likely than nonrecipients to have graduated from high school. Despite such risk attributes, no differences in 3-year persistence rates were detected between Pell Grant recipients and nonrecipients attending either public 2-year or private for-profit less-than-4-year institutions.

Persistence of Pell Grant Recipients Receiving Other Financial Aid or Parental Support

The study also examined 3-year persistence rates for full-time beginning students with a Pell Grant in light of other types of financial assistance received, in particular loan aid and assistance from parents. Among full-time Pell Grant recipients enrolled at private institutions (both not-for-profit 4-year and for-profit less-than-4-year institutions), those who received loan aid during their first year of enrollment were more likely than those who did

Table C.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and level of high school curriculum

Receipt of Pell Grant	Remained enrolled at same or higher level institution in spring 1998[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total in public and private not-for-profit 4-year institutions	
Total	65.0	20.2	14.8
Pell recipient	62.9	20.9	16.2
Nonrecipient	66.1	19.9	14.0
		Core curriculum or lower[3]	
Total	57.6	23.5	18.9
Pell recipient	57.6	24.6	17.8
Nonrecipient	57.6	22.9	19.5
		Mid-level curriculum[4]	
Total	70.0	20.8	9.2
Pell recipient	67.0	21.4	11.6
Nonrecipient	71.6	20.5	7.8
		Rigorous curriculum[5]	
Total	85.9	10.3	3.8
Pell recipient	87.0	7.9	5.2
Nonrecipient	85.5	11.2	3.4

[1]Percentage who were continuously enrolled or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

[3]Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

[4]Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics.

[5]Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, in combination with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

not receive any loans to remain enrolled at an institution of the same level or higher. No such differences in persistence were detected among Pell Grant recipients enrolled at public 2-year or public 4-year institutions.

Finally, Pell Grant recipients were examined with respect to the relationship between persistence and financial support from parents.[1] Unlike the results found for loan aid, no differences in

[1]Dependent students do not necessarily receive financial support from parents even though, for financial aid eligibility determination, their parents' income and assets are taken into consideration.

persistence were observed between Pell Grant recipients who reported receiving financial support from their parents and those who did not.

Relationship of Specific Variables to Persistence

Finally, a multivariate analysis was conducted analyzing the likelihood of remaining enrolled at an institution of the same level or higher for 3 years. The analysis included all full-time low- and middle-income beginning students enrolled at all types of institutions. It took into account Pell Grant receipt and several other variables associated with persistence, including type of institution first attended, demographic characteristics (gender, race/ethnicity, age, and parents' education level), income level (low versus middle), and persistence risk factors.[2] Taken together, these variables accounted for 8.5 percent of the variance in the likelihood of remaining enrolled for 3 years at an institution at the same or higher level.

Before any of the background variables were taken into consideration, among all full-time low- and middle-income beginning students enrolled at all postsecondary institutions, Pell Grant recipients were less likely to remain enrolled than their nonrecipient counterparts. However, the findings from the multivariate analysis showed that no differences in persistence could be detected after controlling for the covariation of related variables. In other words, after taking into account such variables as type of institution first attended, income, parents' education, age, and persistence risk factors, the analysis failed to find a difference in persistence between Pell Grant recipients and nonrecipients.

[2]Bivariate correlations showed that the effect sizes of the independent variables on the likelihood of remaining enrolled for 3 years were small, with correlations ranging from .012 to .190. See appendix B for methodological details.

Foreword

This report describes the population of students who received a Pell Grant and were enrolled in postsecondary education for the first time in 1995–96. The study examines the enrollment characteristics of these students as well as their level of academic preparation and rates of persistence three years after enrolling in a postsecondary institution.

The data used in this report are drawn from the 1995–96 Beginning Postsecondary Students Longitudinal Study (BPS:96/98) First Follow-up, a nationally representative sample of a cohort of first-time beginners in 1995–96. Students in all types of postsecondary institutions were surveyed initially in 1995–96 as part of the National Postsecondary Student Aid Survey, with the First Follow-up of beginning students conducted in spring 1998, 3 years after the students first enrolled. The BPS Longitudinal Study includes information on academic preparation as well as data on persistence, financial aid, and other issues related to postsecondary education.

The NCES Data Analysis System (DAS), a microcomputer application that allows users to generate tables for the BPS Longitudinal Study as well as several other NCES surveys, was used to produce the estimates presented in this report. To allow researchers to perform tests of statistical significance, the DAS produces design-adjusted standard errors necessary for this purpose. Please consult appendix B for more information on the DAS.

Acknowledgments

Many individuals made important contributions to this report. At MPR Associates, the report production team—Francesca Tussing, Andrea Livingston, and Barbara Kridl—formatted, edited, proofed, and coordinated the production of the final report.

The report draft was reviewed by the following adjudication members at the U.S. Department of Education: David Bergeron (Office of the Undersecretary—OUS), Stephen Broughman and Bernard Green (National Center for Education Statistics—NCES), and Daniel Goldenberg (Office of Postsecondary Education—OPE). Karen O'Conor served as the adjudication chair and NCES technical representative. Thanks to all these reviewers who made valuable contributions to the final report.

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Introduction

Since its inception more than 25 years ago, the Pell Grant program has provided financial support to approximately 30 million students, many of whom could not otherwise have afforded a postsecondary education. The goal of the program is equal educational opportunity by providing a "floor of portable financial aid, distributed entirely on the basis of need" (Turner 1998).

The Pell Grant program is the largest program of need-based grant aid available to postsecondary students. In 1998–99, the federal government spent $7.2 billion on Pell Grants for 3.8 million students (U.S. Department of Education 1999). Students can use the Pell Grant at a wide range of postsecondary institutions, including almost all 2- and 4-year public and private not-for-profit institutions, as well as several thousand private for-profit institutions. Twenty-nine percent of all students who began postsecondary education for the first time in 1995–96 received a Pell Grant.[1] The Pell Grant is available for fees, tuition, and living expenses, and the average amount awarded to students in 1998–99 was $1,876. The maximum award for that year, based on the annual federal appropriation for the program, was $3,000.[2]

Pell Grant recipients consist primarily of students from low-income families. The Department of Education determines who is eligible for federally funded financial support, including Pell Grants, based on a formula called the "Expected Family Contribution" (EFC). This formula takes into account several factors affecting a student's ability to pay for a postsecondary education. The most important factors in the equation are the student's income and assets (for independent students), or parents' income and assets (for dependent students).[3] Some students from middle-income families may receive a Pell Grant due to other circumstances affecting their financial need, such as having siblings who are also enrolled in college.

Between 1976–77 and 1998–99, the number of Pell Grant recipients doubled, from 1.9 million to more than 3.8 million per year. Program expenditures increased by 75 percent in inflation-adjusted terms due to at least two factors: increases in higher education enrollments during this period (including the number of low-income students) and an expansion of eligibility re-

[1] U.S. Department of Education, National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study (BPS:96/98), Data Analysis System.

[2] The maximum award for 2000–2001 was $3,750 (U.S. Department of Education 1999).

[3] Students who are considered dependent for financial aid purposes, are those under the age of 24, unless they are married or have children. For dependent students, parents' income and assets are taken into account when determining their EFC.

quirements. However, augmentations in program funding have not translated into more purchasing power for the individual student. The maximum Pell Grant now covers a smaller proportion of the price of attending college than it did in the early years of the program, because Pell Grants have not increased at the same rate as college prices (King 2000).

Persistence and Attainment of Pell Grant Recipients

While discussions about the Pell Grant program have centered on its goal of providing access to postsecondary education and its success in doing so, the public is also concerned about student outcomes. Many want to know how well Pell Grant recipients fare in postsecondary education once they overcome the immediate financial obstacles to enrollment. Do they persist and graduate at rates similar to nonrecipients?

The problem with answering this question is that a Pell Grant can only directly influence one dimension of a student's life—albeit an important one—once that student is enrolled in college. Due to their low-income status, Pell Grant recipients often come from disadvantaged environments and have poor academic preparation, affecting their ability to succeed in postsecondary education regardless of whether any financial barriers have been removed. Various factors can affect a student's propensity toward completing or stopping their studies prematurely, many of which are related to a student's academic preparation and socioeconomic background as well as any financial and practical concerns (Horn and Premo 1995).

However, much can be learned about the role of financial aid in helping students persist in postsecondary education. Previous studies on financial aid and persistence have shown that there appears to be a positive relationship between grants and persistence,[4] though few studies have focused specifically on Pell Grants and their relationship to persistence. As with most types of student financial aid, it is difficult to isolate the effects of Pell Grants from those of other financial support because aid recipients—especially need-based aid recipients—frequently receive multiple types of support. A student's financial aid package can consist of a mixture of grants, loans, work-study, and other awards.

Lee found that Pell Grant recipients who began their postsecondary studies in 1989–90 had a persistence rate that was 8 percentage points lower than that of nonrecipients.[5] When recipients' rates of persistence were analyzed by income, Lee found that among the lowest income students, recipients persisted at a higher rate than those who did not receive Pell Grants. These findings,

[4]See, for example, U.S. Government Accounting Office (1995). This report found that grant aid was positively associated with persistence, particularly when it was received during the first year of enrollment.

[5]These findings were based on the 1990–94 Beginning Postsecondary Students Longitudinal Study (BPS:90/94) (Lee 1998).

however, did not control for institution type or academic preparation. This analysis discussed in the current study examines Pell Grant recipients' outcomes with respect to both institution type and academic preparation.

Organization of This Report

After a discussion of the data and methods, this report is divided into four sections. The first section provides an overview of all beginning Pell Grant recipients by institution type. The remaining sections control for income (by analyzing only low- and middle-income students). Section two provides a description of academic preparation, postsecondary attendance intensity (full-time versus part-time), employment status, and an analysis of persistence risk factors. The third section provides a description of 3-year persistence and attainment rates, within institution types, and levels of academic preparation. Finally, a multivariate analysis was conducted to control for the relationships of various individual demographic and academic variables to 3-year persistence and attainment. The following questions are addressed in this study:

1) What types of postsecondary institutions do beginning Pell Grant recipients attend? How much do students receive from the Pell Grant program according to the type of institution they attend? What other types of financial aid do these students receive?

2) What are the academic background and postsecondary enrollment characteristics of beginning students with Pell Grants? What types of persistence risk factors do beginning Pell Grant recipients tend to have? How do Pell Grant recipients differ, in terms of these characteristics, compared with low- and middle-income students who do not receive these grants? How do they differ by type of institution attended?

3) What are the persistence and attainment rates of beginning Pell Grant students three years after starting postsecondary education by type of institution attended? How do these rates compare with those of low- and middle-income students who do not receive these grants?

Many comparisons between Pell Grant recipients and nonrecipients are reported in this study. When differences are reported, they were statistically tested (using t-tests or ANOVA) at the .05 alpha level.[6] If the t-test or F test did not exceed the critical level, the report states that no difference could be detected (see appendix B for details of statistical methods).

[6] When several groups within a "family" was compared (such as levels of academic preparation), the significance level was adjusted to take into account all possible comparisons (see appendix B).

Data and Definitions of Variables

This report uses data from the 1996–98 Beginning Postsecondary Students longitudinal study (BPS:96/98). The survey includes the postsecondary education outcomes of students three years after their initial enrollment in 1995–96. Students were first interviewed as part of the National Postsecondary Student Aid Study (NPSAS:96) and then reinterviewed in spring 1998. BPS:96/98 is a nationally representative sample of more than 10,000 first-time beginners, including more than 3,000 Pell Grant recipients (see Berkner, Horn, and Clune 2000; Kojaku and Nuñez 1998).

Institution Type

Institution type is a key variable when analyzing persistence and attainment in postsecondary education for Pell Grant recipients. Because institutions have such varying rates of persistence, and Pell Grant recipients are more likely to attend certain types of institutions than others, it was necessary in this study to control for institution type when analyzing persistence and completion rates. Institution type is based on the institution in which the student first enrolled in 1995–96 and includes the following categories:

- Public 4-year institutions
- Private not-for-profit 4-year institutions
- Public 2-year institutions
- Private for-profit less-than-4-year institutions

To provide as much information as possible, most tables include all beginning students in the totals (or all low- and middle-income students where indicated), but due to small sample sizes, students in public less-than-2-year institutions, private not-for-profit less-than-4-year institutions, and private for-profit 4-year institutions are not shown as separate rows.

Attendance Status

While the Pell Grant program allows part-time students (including less-than-half-time students who are not eligible for federal student loan programs) to receive grants, many part-time

students do not receive Pell Grant awards for various reasons.[7] Some part-time students work while they are enrolled, thereby earning income that lowers their eligibility for a Pell Grant. In addition, part-time students generally have lower expenses. In most cases, they are charged lower tuition and fees than are full-time students. This may decrease the likelihood that such students apply for financial aid. Among those who do apply, lower expenses reduce the amount of allowable costs covered by the program, affecting both eligibility and the amount of Pell Grant dollars received. Moreover, federal financial need analysis for the Pell Grant program does not include room and board in the student budget for less-than-half-time students, which further reduces their eligible educational expenses. In addition to differences in Pell Grant eligibility, educational outcomes differ between full- and part-time students. Specifically, attending part time is negatively associated with persistence and degree attainment (Berkner, Horn, and Clune 2000). Therefore, in order to take into account differences in Pell Grant eligibility as well as outcomes, many of the tables are presented in two parts, showing all beginning students followed by those who attended exclusively full time. The multivariate analysis is based on full-time students only.

Income in 1994

Beginning postsecondary students in 1995–96 were aggregated into quartiles based on 1994 annual income. In BPS:96/98, the primary source of data on income was the Free Application for Federal Student Aid (FAFSA) completed by students applying for federal financial aid for the 1995–96 academic year. Applicants were required to provide information on the FAFSA for income earned during 1994.[8] Incomes for independent students include both students' and spouses' incomes, while incomes for dependent students are based on parents' incomes. The income quartiles for independent and dependent students are as follows:

Income quartiles	Independent students	Dependent students
Lowest quartile:	Less than $6,000	Less than $25,000
Low middle quartile:	$6,000–14,999	$25,000–44,999
High middle quartile:	$15,000–24,999	$45,000–69,999
Highest quartile:	$25,000 or more	$70,000 or more

The cutoff point at which dependent students were considered "high income" ($70,000 or more) is consistent with other NCES reports based on BPS:96/98 data. For example, one recent

[7]Among 1995–96 beginning postsecondary students, for example, about one-fifth of part-time students received a Pell Grant, compared to about one-third of full-time students (BPS:96/98 Data Analysis System).

[8]For those without 1995–96 FAFSA information, 1994 income data were collected directly from students and parents via telephone interviews or were imputed.

study on college affordability defined middle-income students as the population of dependent undergraduates with annual family incomes between $35,000 and $70,000 (Lee and Cleary 2001).

In this analysis, it was important to control for income when analyzing differences between Pell Grant recipients and nonrecipients. The Pell Grant program provides a basic level of financial support for needy students. At best, a Pell Grant award increases a low-income student's purchasing power to the level of a middle-income student's. Neither the current method of administration nor the original goals of the program have the intention or the effect of creating circumstances for low-income recipients that would be comparable to those of high-income students. High-income students may not be affected by financial barriers to attendance and completion to the same degree as low- and middle-income students. Previous studies have shown that high-income students have higher rates of completion than students in lower income categories (see, for example, Lee 1998). Therefore, when analyzing students' academic backgrounds, persistence risk characteristics, and postsecondary outcomes, high-income students ($70,000 or more for dependent students; $25,000 or more for independent students) were excluded from comparisons between Pell Grant recipients and nonrecipients. Inclusion of high-income students would increase the persistence and completion rates of nonrecipients in comparison with Pell Grant recipients, most of whom come from low-income households. However, when analyzing the distribution of other types of financial aid and the types of institutions students attend, Pell Grant recipients are compared with all nonrecipients including high-income students.

Academic Background

In addition to demographic background information, the BPS:96/98 survey data have been supplemented with academic background data from ETS and ACT, which include test scores and self-reported courses taken for those who took the college entrance examinations. Among BPS students, 43 percent of those entering 2-year institutions and 93 percent of those entering 4-year institutions took one of the entrance exams (Horn and Kojaku 2001).[9]

SAT I/ACT composite scores were divided into three categories based on score quartiles, with those in the two middle quartiles combined. Those in the lowest quartile scored between 400 and 700 points, those in the two middle quartiles scored between 710 and 1,020 points, and those in the highest quartile had scores in the 1,030 to 1,600 range.

[9]Although self-reported high school grade-point average was also available for these students, this measure was not used because previous research has shown that students tend to self-report grades that are higher than those on their transcripts. Students are, however, more accurate when reporting the types of courses taken while in high school (Horn and Kojaku 2001).

High school curriculum was measured using the "New Basics" as the core curriculum standard, which was defined by the National Commission on Excellence in Education. The amount and types of courses taken while in high school were divided into three major categories: core curriculum or lower, mid-level, and rigorous.[10] The core curriculum includes the following: four years of English and three years each of social studies, mathematics, and science. The mid-level curriculum includes not only the core curriculum requirements but also the following: one year of foreign language; geometry; algebra 1; and any two of biology, chemistry, or physics among the three science classes. A rigorous curriculum includes four years of English and mathematics (including precalculus or higher), three years of a foreign language, and social studies, science (including biology, chemistry, and physics), and at least one advanced placement (AP) class or test.

Persistence Track

Three-year rates of persistence and attainment were measured using the persistence track variable.[11] Students who remain on the persistence track are those who have attained a certificate or degree, have been continuously enrolled at the same institution, or have made a lateral or upward transfer to another institution without an enrollment break of 4 or more months. Departures from the persistence track include downward transfers (such as transferring from a 4-year institution to a less-than-4-year institution) or leaving postsecondary education for more than 4 months and then returning (i.e., stopping out). If a student stops out for more than 4 months and then returns to the original institution or even to a higher level institution, that action still constitutes a departure from the persistence track because enrollment must be continuous if the student is to be considered to have remained on the persistence track.

In this study, Pell Grant recipients and nonrecipients were compared with regard to the rates at which they 1) remained on the persistence track (i.e., attained a certificate/degree or remained enrolled continuously at an institution of the same or higher level); 2) left the persistence track (i.e., stopped out or made an immediate downward transfer); or 3) left postsecondary education without a degree and without returning within the 3-year period.

[10]These categories were first used by Horn and Kojaku (2001) and are defined in detail in appendix A in the glossary under the entry for "CTAKING."

[11]The concept of the "persistence track" was first defined by C.D. Carroll (1989).

Pell Grant Program Recipients by Institution Type

Pell Grant recipients are defined in this study as those who received a Pell Grant during their initial year of enrollment in postsecondary education. In this case, the first year of enrollment was 1995–96 for the cohort of students participating in BPS:96/98. This section of the report includes all beginning postsecondary students who enrolled in postsecondary education for the first time in 1995–96. Taking into account all beginning students, 29 percent received a Pell Grant (table 1a). About one-third (32 percent) did not receive a Pell Grant but received some other type of financial support, and 39 percent did not receive any aid at all.

Table 1a.—Percentage distribution of all 1995–96 beginning postsecondary students according to receipt of Pell Grant, by first institution type and attendance status

First institution type	Pell recipients	No Pell Grant		
		Received other aid[1]	Did not receive aid	Total
		Total		
Total[2]	29.0	32.2	38.9	71.0
Public 4-year	26.3	42.5	31.2	73.8
Private not-for-profit 4-year	24.8	56.4	18.8	75.2
Public 2-year	24.7	19.3	56.0	75.3
Private for-profit less-than-4-year	56.7	27.5	15.8	43.3
		Full-time students		
Total[2]	32.3	37.7	30.0	67.7
Public 4-year	26.1	44.7	29.3	73.9
Private not-for-profit 4-year	24.9	57.7	17.4	75.1
Public 2-year	32.2	22.8	45.1	67.9
Private for-profit less-than-4-year	56.7	28.1	15.2	43.3

[1]Includes loans, work-study, and non-federal grants.

[2]Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Detail may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

The proportion of students receiving Pell Grants varied by institution type. Private for-profit less-than-4-year institutions enrolled the highest percentage of beginning students with Pell Grants in 1995–96, 57 percent, more than the percentages found at all the other institution types included in this study (public 4-year institutions: 26 percent; private not-for-profit 4-year institutions: 25 percent; and public 2-year institutions: 25 percent). Private not-for-profit 4-year institutions enrolled the highest proportion of students who did not receive a Pell Grant but received some other type of financial support (56 percent), and public 2-year institutions enrolled the highest proportion of beginning students receiving no financial support (56 percent).

Similarly, when only full-time students were taken into account, private for-profit less-than-4-year institutions enrolled the highest percentage of Pell Grant recipients (57 percent). Also, private not-for-profit 4-year institutions had the largest proportion of nonrecipients who received other aid (58 percent), and public 2-year institutions had the highest percentage of students who received no financial support (45 percent).

Table 1b displays the proportions of Pell Grant recipients and nonrecipients within institution types by level of selectivity. (See appendix B for more detail on the selectivity classification system.) Based on this system of categorization, selective 4-year colleges and universities were less likely to enroll Pell Grant recipients than were less selective 4-year institutions. This was the case among all beginning students as well as among beginning students who attended exclusively full time.

Another way to compare these beginning students is to estimate how all Pell Grant recipients and nonrecipients are distributed among the institution types (table 2). Among all beginning students, Pell Grant recipients were more likely than nonrecipients to enroll in private for-profit less-than-4-year institutions (21 percent versus 6 percent), and they were less likely to enroll in private not-for-profit 4-year institutions (13 percent versus 16 percent), public 4-year institutions (24 percent versus 27 percent), and public 2-year institutions (39 percent versus 48 percent).

Among all full-time beginning students, Pell Grant recipients also were more likely than nonrecipients to enroll in private for-profit less-than-4-year institutions and were less likely to enroll in public 4-year institutions and private not-for-profit 4-year institutions. However, with respect to the public 2-year sector, no difference was found when comparing the proportions of Pell Grant recipients and nonrecipients who enrolled full-time (33 percent of both recipients and nonrecipients).

Table 1b.—Percentage distribution of all 1995–96 beginning postsecondary students enrolled in 4-year institutions according to receipt of Pell Grant, by selectivity of first institution type and attendance status

Institution selectivity[1]	Pell recipients	No Pell Grant		
		Received other aid[2]	Did not receive aid	Total
		Total		
Total[3]	25.7	47.6	26.7	74.3
Public 4-year				
Selective[4]	19.0	49.1	31.9	81.0
Less selective	31.0	38.2	30.9	69.0
Private not-for-profit 4-year				
Selective[5]	14.4	58.2	27.4	85.5
Less selective	31.8	55.4	12.8	68.2
		Full-time students		
Total[3]	25.7	49.5	24.9	74.5
Public 4-year				
Selective[4]	18.7	50.1	31.1	81.3
Less selective	31.4	40.6	27.9	68.6
Private not-for-profit 4-year				
Selective[5]	14.6	59.1	26.3	85.4
Less selective	32.4	56.7	10.9	67.6

[1]Selective institutions are identified within Carnegie classification and are those institutions in which students' average SAT scores exceeded 1000 or Carnegie classifications in which a majority of students are enrolled in very selective institutions (i.e. the 25th percentile of SAT scores is 1000 or higher identified in the common data set). Less selective are all others not identified as selective.

[2]Includes loans, work-study, and non-federal grants.

[3]Excludes private for-profit 4-year institutions.

[4]Research I or II, and Baccalaureate I.

[5]Research I or II, Doctoral I or II, and Baccalaureate I.

NOTE: Detail may not add to total because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 2.—Percentage distribution of all 1995–96 beginning postsecondary students according to first institution type, by receipt of Pell Grant and attendance status

Receipt of Pell Grant	Public 4-year	Private not-for-profit 4-year	Public 2-year	Private for-profit less-than-4-year	Other*
			Total		
Total	25.9	14.7	45.7	10.6	3.1
Pell recipient	23.5	12.7	38.8	20.6	4.4
Nonrecipient	26.9	15.7	48.3	6.4	2.6
			Full-time students		
Total	32.3	19.1	32.6	12.6	3.4
Pell recipient	26.1	14.8	32.5	22.1	4.6
Nonrecipient	35.3	21.2	32.7	8.0	2.8

*Other institutions include public less-than-2-year institutions, private not-for-profit less-than-4-year institutions, and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Pell Grant Award Amounts and Other Financial Aid Received

Student budgets vary by institution type because there are large differences in the prices charged by institutions for tuition and instruction-related fees. In general, private not-for-profit 4-year institutions have higher levels of tuition than public 4-year institutions. Public 2-year institutions usually are among the lowest price institutions. Since the Pell Grant is determined in part by the total amount of eligible student expenses, differences in Pell Grant award amounts might be expected among institution types. Table 3 shows that those enrolled at public 2-year institutions received a smaller Pell Grant, on average, than did those enrolled at public 4-year institutions. However, when only full-time students are compared, no differences in Pell Grant awards were detected between public 2-year students and those enrolled in any other institutions. Likewise, for beginning students enrolled at 4-year public and private not-for-profit institutions and private for-profit less-than-4-year institutions no differences were detected in the average amount of Pell Grant dollars they received in 1995–96.

Table 3.—Among 1995–96 beginning postsecondary students who received Pell Grants, average Pell Grant award received in 1995–96, average number of years received, and average three-year cumulative amount, by first institution type

First institution type	Average Pell Grant received in 1995–96	Average number of years Pell Grant was received	Average 3-year cumulative Pell Grant
		Total	
Total*	$1,559	1.8	$2,880
Public 4-year	1,670	2.0	3,572
Private not for profit 4-year	1,610	1.9	3,321
Public 2-year	1,484	1.8	2,741
Private for-profit less-than-4-year	1,550	1.4	2,048
		Full-time students	
Total*	1,607	1.8	2,954
Public 4-year	1,691	2.0	3,605
Private not for profit 4-year	1,627	2.0	3,333
Public 2-year	1,589	1.7	2,815
Private for-profit less-than-4-year	1,528	1.4	2,061

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 3 also shows that Pell Grant recipients enrolled at private for-profit less-than-4-year institutions received a grant for fewer years, on average, than those enrolled at other institutions. In addition, the average cumulative Pell Grant amount was lowest among this group of students. This is likely due to the shorter degree and certificate programs offered by these institutions, or a tendency on the part of these students to seek other sources of financing in subsequent years.

Due in part to having lower incomes, beginning Pell Grant recipients were more likely than beginning nonrecipients to qualify for and receive other types of financial support (table 4a). Compared with nonrecipients, Pell Grant recipients were more likely to receive additional aid in the form of loans (49 percent versus 23 percent), work-study (12 percent versus 5 percent), and non-federal grants (47 percent versus 31 percent). As with all beginning Pell Grant recipients, full-time Pell Grant recipients also were more likely than their nonrecipient counterparts to receive loans, work-study assistance, and nonfederal grant aid.

Table 4a.—Among all 1995–96 beginning postsecondary students, percentage receiving major types of financial aid, by receipt of Pell Grant and first institution type

Pell grant status and institution types	Received any aid[1]	Loans	Work-study	Non-federal grants
		Total		
Total[2]	61.2	30.7	7.2	35.4
Pell recipient	100.0	49.0	12.0	47.2
Public 4-year	100.0	63.3	16.5	65.2
Private not for profit 4-year	100.0	79.3	37.7	78.4
Public 2-year	100.0	21.9	8.1	41.5
Private for-profit less-than-4-year	100.0	66.4	0.2	21.4
Nonrecipient	45.3	23.2	5.2	30.5
Public 4-year	57.7	32.2	3.6	37.1
Private not-for-profit 4-year	75.0	49.8	24.6	65.4
Public 2-year	25.6	6.3	0.7	17.6
Private for-profit less-than-4-year	63.4	50.1	0.4	12.8
		Full-time students		
Total	70.0	38.9	9.1	41.4
Pell recipient	100.0	54.6	12.5	49.9
Public 4-year	100.0	64.6	15.6	67.4
Private not for profit 4-year	100.0	81.7	39.6	80.5
Public 2-year	100.0	26.4	6.9	44.4
Private for-profit less-than-4-year	100.0	67.9	0.2	19.9
Nonrecipient	55.7	31.4	7.5	37.4
Public 4-year	60.4	34.7	3.7	38.8
Private not-for-profit 4-year	76.8	52.1	26.6	68.4
Public 2-year	33.5	10.4	1.4	21.4
Private for-profit less-than-4-year	64.9	51.0	0.4	13.6

[1]Includes other aid categories not displayed in this table, such as employer aid, military benefits, and private aid.

[2]Includes institutions listed here as well as public less-than-2-year institutions, private not-for-profit less-than-4-year institutions, and private for-profit 4-year institutions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Pell Grant recipients enrolled at private not-for-profit 4-year institutions were more likely than recipients enrolled at other institutions to receive other types of aid including loans and work-study. In addition, private not-for-profit 4-year institutions will often award additional grant aid to lower income students. Indeed, Pell Grant recipients enrolled at such institutions were more likely than nonrecipients to receive other grant aid (among all beginning students: 78 percent versus 65 percent; among full-time students: 81 percent versus 68 percent).

Average total aid received was estimated for beginning students receiving any type of financial aid, and average award amounts were estimated for those who received a loan, work-study award, or other grant support (table 4b). Among those enrolled at public 4-year institutions, private not-for-profit 4-year institutions, and public 2-year institutions, beginning Pell Grant recipients received, on average, more total aid dollars than did nonrecipients.

The same was not found for beginning students enrolled at private for-profit less-than-4-year institutions. No difference was found between Pell Grant recipients and nonrecipients in the total amount of aid received. However, Pell Grant recipients received, on average, less loan aid ($3,608 versus $4,192) and other grant aid ($1,661 versus $2,645) compared to nonrecipients. In other words, Pell Grant recipients in private less-than-4-year institutions borrowed less than nonrecipients and also received lower amounts of non-federal grant aid, but no differences in the total amount of aid between Pell recipients and nonrecipients could be detected.

Table 4b.—Among all 1995–96 beginning postsecondary students who received aid, average amount received from major types of financial aid, by receipt of Pell Grant and first institution type

Pell grant status and institution types	Total aid received[1]	Loans	Work-study	Non-federal grants
		Total		
Total[2]	$4,924	$3,095	$1,230	$2,953
Pell recipient	5,001	3,092	1,212	2,788
Public 4-year	5,861	2,754	1,296	2,745
Private not for profit 4-year	11,032	3,401	1,218	6,536
Public 2-year	2,658	2,352	1,119	873
Private for-profit less-than-4-year	4,864	3,608	(#)	1,661
Nonrecipient	4,855	3,098	1,246	3,057
Public 4-year	4,171	2,703	1,285	2,303
Private not-for-profit 4-year	9,490	3,387	1,266	5,839
Public 2-year	1,413	2,183	(#)	745
Private for-profit less-than-4-year	5,162	4,192	(#)	2,645
		Full-time students		
Total	5,520	3,146	1,232	3,347
Pell recipient	5,544	3,174	1,211	3,055
Public 4-year	5,977	2,767	1,173	2,733
Private not for profit 4-year	11,463	3,424	1,236	6,695
Public 2-year	2,959	2,390	(#)	952
Private for-profit less-than-4-year	5,049	3,785	(#)	1,672
Nonrecipient	5,499	3,123	1,249	3,533
Public 4-year	4,324	2,715	1,323	2,397
Private not for profit 4-year	9,851	3,403	1,261	6,007
Public 2-year	1,737	2,122	(#)	982
Private for-profit less-than-4-year	5,362	4,258	(#)	2,688

#Too small to report.

[1]Includes other aid categories not displayed in this table, such as employer aid, military benefits, and private aid.

[2]Includes institutions listed here as well as public less-than-2-year institutions, private not-for-profit less-than-4-year institutions, and private for-profit 4-year institutions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Income in 1994

Pell Grant program eligibility is based primarily on the student's and/or parents' income for the previous year and Pell Grants are awarded primarily to low-income students. For example, among 1995–96 beginning students 87 percent of Pell Grants were awarded either to dependent students whose parents' incomes were under $45,000 (59 percent) or to independent students with incomes under $25,000 (28 percent).[12] Other factors are also taken into account, such as student and parent assets and other family members who are concurrently enrolled in college. Table 5 shows the percentage of all full-time, beginning students who applied for financial aid

Table 5.—Percentage of all 1995–96 full-time beginning postsecondary students who applied for financial aid, and among aid applicants the percent receiving a Pell Grant, by 1994 income quartile and dependency status

1994 income quartiles	Percent who applied for financial aid	Percent of aid applicants who received a Pell Grant
Total	79.9	40.2
	Dependent students	
Less than $25,000	89.9	76.5
$25,000–44,999	84.3	38.8
$45,000–69,999	79.0	2.1
$70,000 or more	61.4	0.0
	Independent students	
Less than $6,000	94.6	81.4
$6,000–14,999	83.2	63.3
$15,000–24,999	93.3	70.2
$25,000 or more	65.2	26.2

NOTE: Annual income for dependent students is based on parental income. Annual income for independent students is based on the income of the student and his or her spouse.

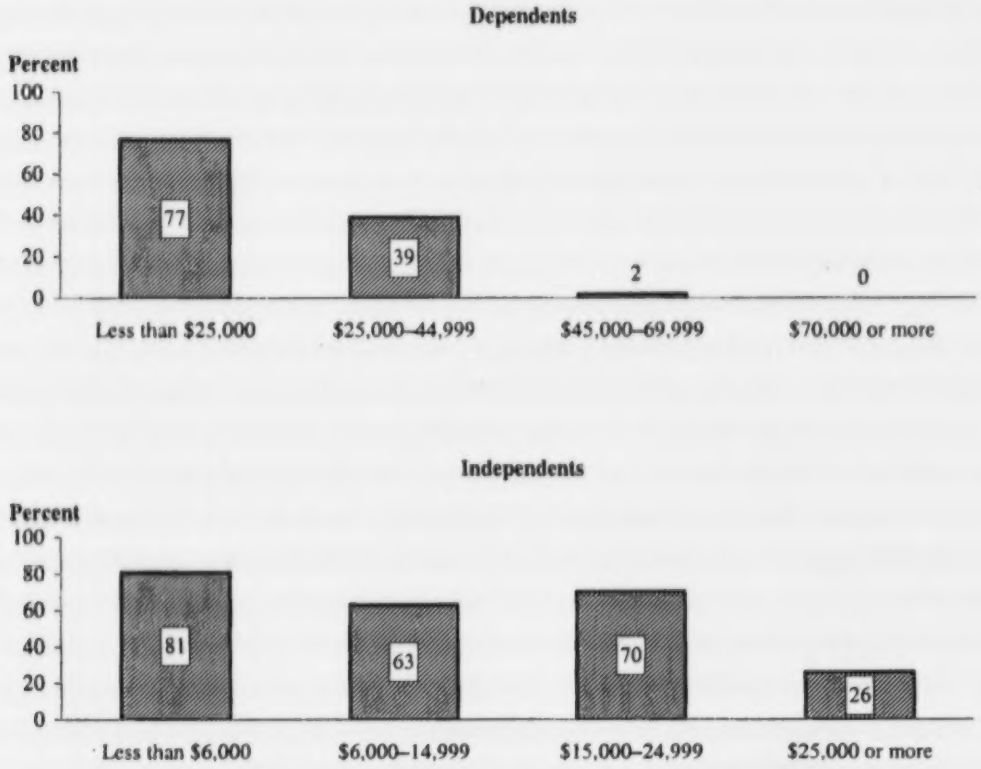
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

[12]U.S. Department of Education, National Center for Education Statistics, 1996/98 Beginning Postsecondary Student Data Analysis System.

and the proportion of those students who received a Pell Grant. Forty percent of all full-time, beginning students who applied for aid received a Pell Grant.

Pell Grants were concentrated among the lowest income dependent students (figure 1). With each successive income category, the less likely it was for a dependent, full-time beginning student who applied for aid to receive a Pell Grant in 1995–96. Three-quarters (77 percent) of aid

Figure 1.—Among full-time beginning students who applied for financial aid, the percentage who received a Pell Grant, by dependency status and income quartile: 1995–96



NOTE: Annual income for dependent students is based on parental income. Annual income for independent students is based on the income of the student and his or her spouse.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

applicants in the lowest income quartile (less than $25,000) received a Pell Grant, while less than one-half (39 percent) of those in the next quartile ($25,000–$44,999) received one. Two percent of dependent aid applicants in the third highest income quartile received a Pell Grant, and no applicants in the highest quartile received one. Dependent students in the highest income quartile also were less likely than students in all of the other income categories to apply for financial aid (table 5). Among independent aid applicants, on the other hand, a majority (63 to 81 percent) of all *but* those in the highest income quartile (26 percent) received Pell Grants.

Academic Preparation and Postsecondary Enrollment

While Pell Grant recipients and nonrecipients differ primarily in terms of their Pell Grant eligibility status (i.e., income and attendance status), they also differ in other ways. Some of these differences are related to factors that increase the risk of attrition from postsecondary education, such as academic preparation, degree objectives, employment, and persistence risk characteristics. Taking into account only low- and middle-income beginning students, Pell Grant recipients were not as well prepared academically as nonrecipients for postsecondary study. For example, as shown in table 6, among low- and middle-income beginning students enrolled at less-than-4-year institutions, Pell Grant recipients were less likely than nonrecipients to have received a high school diploma (77 percent versus 90 percent) and more likely to have received a GED or high school equivalency certificate (17 percent versus 7 percent). Among those enrolled at 4-year institutions, Pell Grant recipients were more likely to have SAT I (or equivalent ACT) scores that were in the lowest quartile (25 percent versus 12 percent) and less likely to have scores in the highest quartile (21 percent versus 34 percent; figure 2). Pell Grant recipients also were more likely than nonrecipients to have completed no higher than a core curriculum in high school (38 percent versus 32 percent) and less likely to have completed a rigorous curriculum (12 percent versus 17 percent; figure 3).

Low- and middle-income Pell Grant recipients and nonrecipients were also compared in terms of their degree objectives (table 7). Compared to nonrecipients, Pell Grant recipients at public 2-year institutions were more likely to be pursuing an associate's degree (60 percent versus 46 percent) and less likely to be working toward a vocational certificate (7 percent versus 15 percent). Pell Grant recipients in private for-profit less-than-4-year institutions were more likely than nonrecipients to be seeking *no* degree or vocational certificate (19 versus 12 percent).

Pell Grant recipients were more likely than nonrecipients to be enrolled as full-time students (64 percent versus 49 percent; table 8). When attendance intensity was examined by institution type, differences between low- and middle-income Pell Grant recipients and nonrecipients were detected only among those enrolled in public 2-year institutions. Pell Grant recipients were

Table 6.—Percentage distribution (by columns) of 1995–96 low- and middle-income beginning postsecondary students according to academic preparation, by receipt of Pell Grant

Student academic preparation characteristics	Total	Pell recipients	Nonrecipients
Total	100.0	100.0	100.0
High school graduation status[1]			
High school diploma	85.3	77.1	90.0
GED or certificate	10.5	16.6	7.0
Did not graduate from high school	4.2	6.3	3.0
SAT I/ACT composite score[2]			
Low quartile (400–700)	16.4	24.7	12.0
Middle quartiles (710–1020)	54.3	54.3	54.3
High quartile (1030–1600)	29.3	21.0	33.7
High school curriculum[3]			
Core curriculum or lower	33.9	37.9	31.7
Mid-level curriculum	51.2	50.5	51.7
Rigorous curriculum	14.9	11.6	16.7

[1]For those attending less-than-four-year institutions only. "GED" stands for General Equivalent Development.

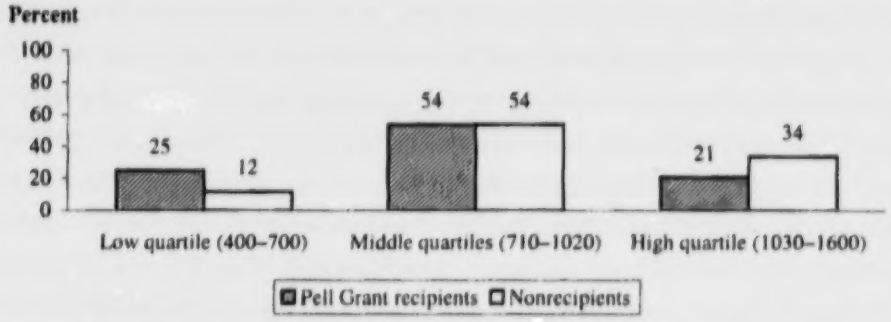
[2]For those attending 4-year institutions only. The SAT/ACT composite score variable is the sum of the verbal and mathematics scores on the SAT. If the ACT examination was taken, the ACT score was converted to an estimated SAT combined score.

[3]For those attending 4-year institutions only. Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science. Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics. Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken. From L. Horn and L.K. Kojaku, High School Academic Curriculum and the Persistence Path Through College, U.S. Department of Education, National Center for Education Statistics (Washington, DC: 2001).

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had an annual income of less than $70,000 in 1994 and all independent students who, in combination with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

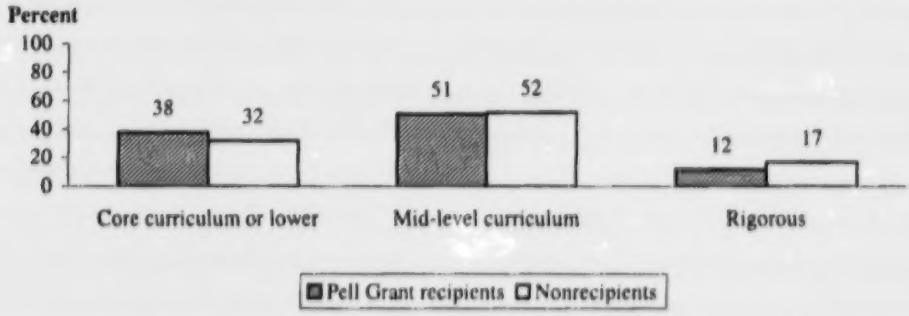
Figure 2.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to SAT I/ACT composite score quartiles, by receipt of Pell Grant



NOTE: Low- and middle-income students include all dependent students whose parents had an annual income in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had an annual income in 1994 of less than $25,000. The SAT I/ACT composite score variable is the sum of the verbal and mathematics scores on the SAT. If the ACT examination was taken, the ACT score was converted to an estimated SAT combined score.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Figure 3.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to level of high school curriculum, by receipt of Pell Grant



NOTE: Low- and middle-income students include all dependent students whose parents had an annual income in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had an annual income in 1994 of less than $25,000. Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science. Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics. Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken. From L. Horn, and L.K. Kojaku, *High School Academic Curriculum and the Persistence Path Through College*, U.S. Department of Education, National Center for Education Statistics (Washington, D.C.: 2001). Detail may not add to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 7.—Percentage distribution (by columns) of 1995–96 low- and middle-income beginning postsecondary students according to degree objective, by receipt of Pell Grant and first institution type

Degree objective	Total	Pell recipients	Nonrecipients
Total	100.0	100.0	100.0
		All institutions*	
None	11.4	11.4	11.4
Certificate	15.4	17.1	14.4
Associate's degree	28.2	29.7	27.3
Bachelor's degree or transfer to 4-year	45.0	41.9	46.9
		Public 4-year	
None	5.3	3.6	6.3
Certificate	1.1	1.2	1.1
Associate's degree	4.1	6.0	3.0
Bachelor's degree or transfer to 4-year	89.5	89.2	89.6
		Private not-for-profit 4-year	
None	6.4	7.8	5.7
Certificate	1.4	1.0	1.6
Associate's degree	3.7	4.3	3.4
Bachelor's degree or transfer to 4-year	88.5	87.0	89.4
		Public 2-year	
None	14.4	12.9	15.1
Certificate	12.4	7.3	14.5
Associate's degree	50.4	60.1	46.4
Bachelor's degree or transfer to 4-year	22.8	19.6	24.0
		Private for-profit less-than-4-year	
None	16.4	18.9	12.1
Certificate	63.9	61.4	68.2
Associate's degree	18.2	18.5	17.7
Bachelor's degree or transfer to 4-year	1.5	1.3	2.0

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had an annual income of less than $70,000 in 1994 and all independent students who, in combination with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 8.—Percentage distribution (by columns) of 1995–96 low- and middle-income beginning postsecondary students according to attendance intensity, by receipt of Pell Grant and first institution type

Attendance intensity through spring 1998	Total	Pell recipients	Nonrecipients
Total	100.0	100.0	100.0
		All institutions*	
Always full time	54.5	63.7	49.2
Always part time	14.0	7.5	17.7
Mixed	31.5	28.8	33.1
		Public 4-year	
Always full time	74.5	77.4	72.9
Always part time	2.9	1.9	3.4
Mixed	22.6	20.7	23.8
		Private not-for-profit 4-year	
Always full time	79.4	78.8	79.7
Always part time	2.8	2.3	3.1
Mixed	17.9	18.9	17.3
		Public 2-year	
Always full time	31.7	41.7	27.5
Always part time	23.7	11.4	28.9
Mixed	44.6	46.8	43.6
		Private for-profit less-than-4-year	
Always full time	76.8	77.8	74.9
Always part time	9.6	9.4	10.0
Mixed	13.5	12.7	15.2

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had an annual income of less than $70,000 in 1994 and all independent students who, in combination with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

more likely than nonrecipients to be enrolled full time (42 percent versus 28 percent) and less likely to be enrolled part time (11 percent versus 29 percent).

As shown in table 9, low- and middle-income Pell Grant recipients enrolled at public 2-year institutions also were less likely than nonrecipients to work full time (24 percent versus 37 percent) and more likely not to be employed (32 percent versus 15 percent). These differences may be due in part to the benefits of the Pell Grant itself. The Pell Grant may reduce students' finan-

Table 9.—Percentage distribution (by columns) of 1995–96 low- and middle-income beginning postsecondary students according to employment status, by receipt of Pell Grant and first institution type

Employment status in 1995–96	Total	Pell recipients	Nonrecipients
Total	100.0	100.0	100.0
		All institutions*	
Did not work	28.4	36.1	23.9
Worked part time	48.7	46.5	49.9
Worked full time	23.0	17.4	26.2
		Public 4-year	
Did not work	36.2	38.0	35.1
Worked part time	53.2	52.5	53.6
Worked full time	10.6	9.6	11.2
		Private not-for-profit 4-year	
Did not work	28.4	27.0	29.1
Worked part time	61.4	63.5	60.3
Worked full time	10.2	9.6	10.5
		Public 2-year	
Did not work	19.9	32.0	15.2
Worked part time	46.9	44.2	48.0
Worked full time	33.2	23.8	36.9
		Private for-profit less-than-4-year	
Did not work	43.9	46.8	38.7
Worked part time	34.4	33.5	36.0
Worked full time	21.8	19.8	25.3

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had an annual income of less than $70,000 in 1994 and all independent students who, in combination with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

cial need which in turn, may enable them to work less and attend classes full time. At the same time, income earned from full-time employment can decrease eligibility for a Pell Grant as can part-time attendance, which reduces one's allowable expenses. Thus, it is probable that Pell Grant recipients are less likely to be enrolled part time and less likely to work full time due to the Pell Grant program's eligibility requirements.

Persistence Risk Factors

Horn and Premo (1995) identified seven characteristics that are associated with leaving postsecondary education without a degree. These include not having received a high school diploma (i.e., did not graduate from high school or finished with a GED or equivalency certificate), delaying enrollment in postsecondary education, being financially independent, having dependents other than one's spouse, being a single parent, attending part time, and working full time while enrolled.

Table 10.—Among 1995–96 low- and middle-income beginning postsecondary students, average number of risk factors and percentage with each persistence risk factor, by receipt of Pell Grant and first institution type

Receipt of Pell Grant	Average number of risk factors	No high school diploma	Delayed enrollment	Financially independent	Have children	Single parent	Enrolled part time	Worked more than 35 hours per week
				Total*				
Total	1.5	10.2	37.9	26.4	15.7	11.1	28.0	23.0
Pell recipients	1.7	15.4	46.4	37.7	27.0	20.5	19.1	17.4
Nonrecipients	1.3	7.2	33.0	19.7	9.0	5.6	33.2	26.2
				Public 4-year				
Total	0.5	2.2	21.0	7.4	3.5	2.5	10.2	10.6
Pell recipients	0.6	2.5	23.7	11.4	7.1	5.4	10.0	9.6
Nonrecipients	0.5	2.1	19.4	5.2	1.4	0.8	10.3	11.2
				Private not-for-profit 4-year				
Total	0.5	3.1	19.0	9.3	3.5	2.3	7.2	10.2
Pell recipients	0.5	5.9	20.5	12.7	5.9	4.3	6.9	9.6
Nonrecipients	0.4	1.4	18.2	7.3	2.2	1.2	7.3	10.5
				Public 2-year				
Total	1.9	11.8	43.7	31.2	18.6	12.5	46.0	33.2
Pell recipients	2.2	17.9	56.9	46.5	34.3	25.8	32.2	23.8
Nonrecipients	1.8	9.2	38.2	24.7	12.0	6.9	51.8	36.9
				Private for-profit-less-than-4-year				
Total	2.5	27.3	66.8	60.1	40.4	31.7	14.8	21.8
Pell recipients	2.7	32.5	68.5	64.7	48.6	37.6	13.3	19.8
Nonrecipients	2.1	17.1	63.8	50.9	24.2	19.9	17.8	25.3

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Low- and middle-income students include all dependent students whose parents had an annual income in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had an annual income in 1994 of less than $25,000.

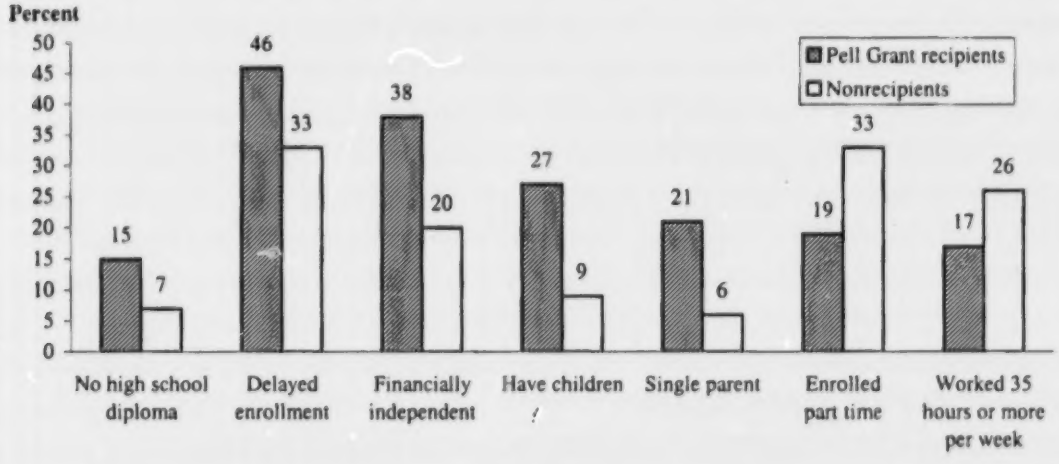
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Among all beginning low- and middle-income students, Pell Grant recipients had more persistence risk factors than nonrecipients (table 10). Pell Grant recipients averaged a total of 1.7 risk factors, compared with an average of 1.3 for students without Pell Grants. The average number and types of persistence risk characteristics among recipients varied by institution type. Recipients who were enrolled at less-than-4-year institutions had a higher average number of persistence risk factors than did those enrolled at 4-year institutions.

Pell Grant recipients were more likely than nonrecipients to have all of the persistence risk characteristics, except part-time enrollment and full-time employment (figure 4). When compared with nonrecipients, they were more likely not to have received a high school diploma (15 percent versus 7 percent), to have delayed their enrollment in postsecondary education (46 percent versus 33 percent), to be financially independent (38 percent versus 20 percent), to have children (27 percent versus 9 percent), and to be single parents (21 percent versus 6 percent). They were less likely, however, to enroll part time (19 percent versus 33 percent) or to work more than 35 hours per week (17 percent versus 26 percent).

When examining risk within each institution type, with the exception of those enrolled in private not-for-profit 4-year institutions, Pell Grant recipients averaged more risk factors than

Figure 4.—Percentage of 1995–96 low- and middle-income beginning postsecondary students with persistence risk factors, by receipt of Pell Grant



NOTE: Low- and middle-income students include all dependent students whose parents had an annual income in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

nonrecipients (table 10). In all institution types Pell Grant recipients were more likely to be independent, to have children, and to be single parents. With the exception of those enrolled in public 4-year institutions, Pell Grant recipients also were less likely to have earned a high school diploma. Differences in attendance intensity, employment status, and delayed enrollment appeared between Pell Grant recipients and nonrecipients enrolled at public 2-year institutions: Pell Grant recipients were less likely than nonrecipients to enroll part time (32 percent versus 52 percent) and to work full time (24 percent versus 37 percent). They were also more likely than nonrecipients to have delayed their enrollment (57 percent versus 38 percent).

Three-Year Persistence and Attainment

As previously discussed, compared to nonrecipients, Pell Grant recipients were less well prepared academically for postsecondary study. They were more likely to have SAT I/ACT scores in the lowest quartile and were less likely to have taken a rigorous curriculum while in high school. Pell Grant recipients also were more likely than nonrecipients to have several persistence risk factors. Given these relative disadvantages, it might be expected that Pell Grant recipients would not persist as well as nonrecipients. Examining persistence rates within institution types, the analysis detected some differences between recipients and nonrecipients among those enrolled in private not-for-profit 4-year institutions who had not completed rigorous high school academic curricula. However, the analysis detected few differences between recipients and nonrecipients in other institution types. The details of these findings are discussed below.

4-Year Institutions

As shown in table 11a, when three-year persistence rates were examined among low- and middle-income beginning students enrolled at public and private not-for-profit 4-year institutions combined, the analysis failed to find a difference between Pell Grant recipients and nonrecipients in their likelihood of remaining enrolled at an institution of the same or higher level, stopping out or making a downward transfer, or leaving postsecondary education without a degree. One difference was detected when taking SAT I/ACT composite score levels into account, however: Pell Grant recipients who scored in the lowest test quartile were less likely than nonrecipients with comparable test scores to leave postsecondary education (16 percent versus 26 percent). When persistence rates were analyzed by level of high school curriculum completed among those in 4-year institutions, no differences in persistence were observed between Pell Grant recipients and nonrecipients (table 11b). Persistence rates were then analyzed further by sector, looking at public and private not-for-profit 4-year institutions separately.

Public 4-Year Institutions

As was found for those enrolled in all 4-year institutions, at public 4-year institutions no overall differences between low- and middle-income Pell recipients and nonrecipients were detected in their rates of persistence (table 12a). However, Pell Grant recipients in the lowest SAT I/ACT composite score quartile were less likely than nonrecipients to leave without a degree (15

Table 11a.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and SAT I/ACT composite score

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
	Total in public and private not-for-profit 4-year institutions		
Total	65.0	20.2	14.8
Pell recipient	62.9	20.9	16.2
Nonrecipient	66.1	19.9	14.0
	Low quartile (400–700)		
Total	51.9	27.8	20.4
Pell recipient	53.7	30.8	15.5
Nonrecipient	49.9	24.5	25.6
	Middle quartiles (710–1020)		
Total	64.0	22.4	13.6
Pell recipient	63.2	21.4	15.4
Nonrecipient	64.4	23.0	12.6
	High quartile (1030–1600)		
Total	79.0	13.1	7.9
Pell recipient	81.2	10.5	8.3
Nonrecipient	78.3	13.9	7.8

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, in combination with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 11b.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and level of high school curriculum

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
	Total in public and private not-for-profit 4-year institutions		
Total	65.0	20.2	14.8
Pell recipient	62.9	20.9	16.2
Nonrecipient	66.1	19.9	14.0
	Core curriculum or lower[3]		
Total	57.6	23.5	18.9
Pell recipient	57.6	24.6	17.8
Nonrecipient	57.6	22.9	19.5
	Mid-level curriculum[4]		
Total	70.0	20.8	9.2
Pell recipient	67.0	21.4	11.6
Nonrecipient	71.6	20.5	7.8
	Rigorous curriculum[5]		
Total	85.9	10.3	3.8
Pell recipient	87.0	7.9	5.2
Nonrecipient	85.5	11.2	3.4

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

[3]Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

[4]Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics.

[5]Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, in combination with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 12a.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at public 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and SAT I/ACT composite score

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total in public 4-year institutions	
Total	63.1	22.0	14.8
Pell recipient	63.6	21.1	15.3
Nonrecipient	62.9	22.6	14.6
		Low quartile (400–700)	
Total	51.3	27.6	21.1
Pell recipient	55.5	29.3	15.3
Nonrecipient	46.6	25.8	27.6
		Middle quartiles (710–1020)	
Total	63.0	23.3	13.7
Pell recipient	63.0	19.9	17.2
Nonrecipient	63.0	25.1	12.0
		High quartile (1030–1600)	
Total	75.0	15.0	10.0
Pell recipient	81.8	10.8	7.4
Nonrecipient	72.8	16.4	10.8

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

percent versus 28 percent); while those scoring in the middle quartiles were more likely to do so (17 percent versus 12 percent). No differences, on the other hand, between recipients and nonrecipients in either of these test score groups (lowest or middle quartiles) were detected in the likelihood of remaining enrolled at an institution at the same or higher level. The analysis also detected no differences between recipients and nonrecipients for any of the persistence measures when taking into account high school academic curricula (table 12b).

Table 12b.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at public 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and level of high school curriculum

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total in public 4-year institutions	
Total	63.1	22.0	14.8
Pell recipient	63.6	21.1	15.3
Nonrecipient	62.9	22.6	14.6
		Core curriculum or lower[3]	
Total	57.5	24.1	18.5
Pell recipient	60.0	22.0	18.0
Nonrecipient	55.7	25.5	18.8
		Mid-level curriculum[4]	
Total	68.0	22.7	9.3
Pell recipient	68.7	20.0	11.3
Nonrecipient	67.6	24.2	8.2
		Rigorous curriculum[5]	
Total	83.5	11.8	4.7
Pell recipient	85.1	9.2	5.7
Nonrecipient	83.0	12.7	4.4

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

[3]Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

[4]Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics.

[5]Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Private Not-For-Profit 4-Year Institutions

As shown in table 13a, low- and middle-income beginning Pell Grant recipients enrolled at private not-for-profit 4-year institutions were less likely than nonrecipients to remain enrolled at an institution of the same or higher level (62 percent versus 72 percent). However, after taking SAT I/ACT composite scores into consideration, no differences between Pell Grant recipients and nonrecipients could be detected for any of the three separate outcomes of enrollment: remaining enrolled, stopping out or transferring to a lower level institution, or leaving postsecond-

Table 13a.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at private not-for-profit 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and SAT I/ACT composite score

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
	Total in private not-for-profit 4-year institutions		
Total	68.3	17.0	14.7
Pell recipient	61.6	20.5	17.9
Nonrecipient	72.1	15.0	12.9
	Low quartile (400–700)		
Total	53.3	28.2	18.5
Pell recipient	49.1	34.7	16.2
Nonrecipient	57.6	21.5	20.9
	Middle quartiles (710–1020)		
Total	66.2	20.5	13.3
Pell recipient	63.6	24.4	12.0
Nonrecipient	67.6	18.3	14.1
	High quartile (1030–1600)		
Total	84.4	10.4	5.2
Pell recipient	80.3	10.0	9.7
Nonrecipient	85.7	10.6	3.8

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

ary education without a degree. While it appears as though Pell Grant recipients who scored in the lowest test quartile were less likely to remain enrolled than their nonrecipient counterparts (49 percent versus 58 percent), there was not enough statistical evidence to draw this conclusion.

Table 13b.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at private not-for-profit 4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and level of high school curriculum

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total in private not-for-profit 4-year institutions	
Total	68.3	17.0	14.7
Pell recipient	61.6	20.5	17.9
Nonrecipient	72.1	15.0	12.9
		Core curriculum or lower[3]	
Total	58.0	22.3	19.7
Pell recipient	51.2	31.5	17.3
Nonrecipient	61.2	17.8	20.9
		Mid-level curriculum[4]	
Total	74.0	17.1	9.0
Pell recipient	63.7	24.1	12.2
Nonrecipient	79.6	13.3	7.2
		Rigorous curriculum[5]	
Total	89.2	8.2	2.6
Pell recipient	89.4	6.1	4.5
Nonrecipient	89.1	9.1	1.9

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

[3]Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.

[4]Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics.

[5]Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, combined with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

When persistence rates were analyzed by level of high school curriculum (table 13b), Pell Grant recipients who had taken a mid-level curriculum were less likely than their nonrecipient-counterparts to remain enrolled at an institution of the same or higher level (64 percent versus 80 percent). The same appears to be the case for those who completed no higher than core curricula (51 percent versus 61 percent), but there was not enough statistical evidence to draw this conclusion. However, among those who completed a rigorous curriculum, no differences in persistence rates were detected between Pell Grant recipients and nonrecipients (89 percent of both groups remained enrolled at the same or similar level institution).

Less-Than-4-Year Institutions

Despite having more persistence risk characteristics, in particular being less likely to have graduated from high school, among those enrolled at less-than-4-year institutions, no differences were detected between Pell Grant recipients and nonrecipients in their likelihood of persisting among beginning, low- and middle-income students (table 14). Although it appears as if recipients enrolled at private for-profit less-than-4-year institutions persisted at a lower rate than nonrecipients (53 percent versus 62 percent), there was not enough statistical evidence to show this result.[13]

Controlling for Loan Aid Among Pell Grant Recipients

As was shown in table 4a, about one-half of Pell Grant recipients received students loans. Loan aid appeared to be a factor in persistence among Pell Grant recipients enrolled at private, not-for-profit and for-profit institutions where students experience greater financial need. Among full-time beginning students enrolled at private institutions (not-for-profit 4-year and for-profit less-than-4-year institutions), Pell Grant recipients who received student loans during their first year were more likely than recipients who did not receive loans to remain enrolled at an institution of the same or higher level (table 15). Furthermore, among those enrolled at private for-profit less-than-4-year institutions, Pell Grant recipients who borrowed were less likely than recipients who did not borrow to leave without a degree (30 percent versus 45 percent). However, at the public institutions (2-year and 4-year public institutions), no differences were detected between full-time recipients who received loan aid and those who did not.[14]

[13]The lack of statistical evidence showing a difference in persistence rates between Pell Grant recipients and non-recipients enrolled at private for-profit less-than-4-year institutions may be due to the small sample sizes of these two groups.

[14]While it appears as though borrowers in public 2-year institutions were less likely than nonborrowers to leave postsecondary education (28 versus 38 percent) and more likely to stop out or transfer down (35 versus 23 percent), there was not enough statistical evidence to draw this conclusion.

Table 14.—Percentage distribution of 1995–96 low- and middle-income beginning postsecondary students enrolled at less-than-4-year institutions according to their enrollment status in 1998, by receipt of Pell Grant and first institution type

Receipt of Pell Grant	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		Total	
Total[3]	44.9	19.4	35.7
Pell recipient	45.8	18.5	35.8
Nonrecipient	44.5	19.9	35.6
		Public 2-year	
Total	42.4	21.1	36.6
Pell recipient	42.0	20.9	37.1
Nonrecipient	42.5	21.2	36.3
		Private for-profit less-than-4-year	
Total	56.2	12.1	31.8
Pell recipient	53.0	13.8	33.2
Nonrecipient	62.4	8.6	29.0

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

[3]Includes public 2-year and private for-profit less-than-4-year institutions. Due to small sample size, does not include public less-than-2-year institutions or private not-for profit less-than-4-year institutions.

NOTE: Detail may not add to 100 because of rounding. Low- and middle-income students include all dependent students whose parents had an annual income of less than $70,000 in 1994 and all independent students who, in combination with their spouse's earnings, had an annual income in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Table 15.—Among all 1995–96 full-time beginning postsecondary students who received a Pell Grant, percentage distribution according to their enrollment status in 1998, by receipt of loan aid in 1995–96 and first institution type

Receipt of loan aid in 1995–96	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
		All institutions[3]	
Total	51.4	20.9	27.7
Did not receive loan aid	45.3	21.2	33.5
Received loan aid	56.5	20.7	22.8
		Public 4-year institutions	
Total	62.8	20.7	16.5
Did not receive loan aid	67.4	19.1	13.5
Received loan aid	60.2	21.6	18.2
		Private not-for-profit 4-year institutions	
Total	61.6	20.8	17.6
Did not receive loan aid	49.8	28.5	21.7
Received loan aid	64.4	19.0	16.6
		Public 2-year institutions	
Total	38.0	26.5	35.5
Did not receive loan aid	38.5	23.2	38.3
Received loan aid	36.7	35.4	27.9
		Private for-profit less-than-4-year institutions	
Total	51.3	14.1	34.6
Did not receive loan aid	39.4	15.5	45.1
Received loan aid	57.0	13.4	29.6

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or stopped out for more than 4 months.

[3]Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

NOTE: Detail may not add to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

Controlling for Parental Support Among Pell Grant Recipients

It is possible that financial support from families may also play a role in postsecondary persistence and attainment, such that students who do not receive any financial support from their parents might have more difficulty remaining in school. Among all dependent beginning Pell Grant recipients, no differences in persistence were observed between those who reported that they did not receive any financial support from their parents and those who indicated they did (table 16).[15]

Table 16.—Among all 1995–96 dependent beginning postsecondary students who received a Pell Grant, percentage distribution according to their enrollment status in 1998, by receipt of financial support from parents in 1995–96

Receipt of financial support from parents in 1995–96	Remained enrolled at an institution of the same or higher level[1]	Stopped out or transferred to lower level institution[2]	Left postsecondary education without a degree by spring 1998
Total	58.0	19.9	22.2
Parents did not provide financial support	56.4	16.9	26.7
Parents provided financial support	60.3	18.5	21.3

[1]Percentage of students who were continuously enrolled at the same institution or made immediate lateral or upward transfers to other institutions.

[2]Percentage who made downward transfers (for example, transferring from a 4-year institution to a less-than-4-year institution) or left for more than 4 months and then returned (i.e., stopped out).

NOTE: Detail may not add to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

[15] Dependent students do not necessarily receive financial support from parents even though, for financial aid eligibility determination, their parents' income and assets are taken into consideration.

Analysis of Persistence Controlling for Background Variation

Thus far, the analysis has focused on the academic and enrollment characteristics of Pell Grant recipients who began their postsecondary education in 1995–96, and whether their rates of persistence after three years differed from those of other students using simple crosstabular analyses. However, many of the characteristics analyzed, such as income level and the types of institutions attended, are interrelated. A multivariate analysis was conducted to determine the commonality of relationships among these variables with the rates of persistence among beginning students. See appendix B for a detailed description of the method used.

The multivariate analysis was limited to full-time, low- and middle-income beginning postsecondary students. It analyzed how likely these students were to remain enrolled continuously at an institution of the same or higher level while controlling for the covariation of the following variables: receipt of Pell Grant, gender, race/ethnicity, age, income level (low versus middle), parents' highest level of education, institution type first attended, high school completion, delayed enrollment, employment status, dependency status, number of dependents other than spouse, and single parent status.[16]

The results of the multiple regression analysis are shown in table 17. The first column includes the unadjusted percentages, which are the percentages of full-time, low- and middle-income beginning students who remained enrolled at the same or higher level institution before adjusting for the covariation of all the other independent variables in the model.[17] The column with the adjusted percentages includes the expected value for each subgroup after adjusting for covariance among the other variables. Comparisons are made between the subgroup and the reference group (in italics), and all significant differences are designated with an asterisk. The independent variables accounted for 8.5 percent of the variance of remaining enrolled for three years.

The unadjusted percentages showed that among all full-time low- and middle-income students, Pell Grant recipients were less likely to remain enrolled continuously at the same or a higher level institution than nonrecipients (53 percent versus 61 percent). This difference was found in part because Pell Grant recipients are more likely than nonrecipients to be enrolled in

[16]Measures of academic preparation could not be included because they were available only for those enrolled in 4-year institutions.

[17]Bivariate correlations showed that the effect sizes of the independent variables on the likelihood of remaining enrolled for three years were small, with correlations ranging from .012 to .190. See appendix B for details.

Table 17.—Percentage of 1995–96 full-time, low- and middle-income beginning postsecondary students who remained enrolled continuously at the same or a higher level institution in 1998, and the adjusted percentage after taking into account the covariation of the variables in the table

Student characteristics	Unadjusted percentage[1]	Adjusted percentage[2]	Least squares coefficient[3]	Standard error[4]
Total	57.6	57.6	69.9	2.4
Receipt of Pell Grant in 1995-96				
Did not receive Pell Grant	*60.9*	*58.5*	†	†
Received Pell Grant	53.0*	56.4	-2.1	1.9
Institution type				
Public 4-year	*65.5*	*61.3*	†	†
Private not-for-profit 4-year	71.5*	66.2*	4.9	2.2
Public 2-year	45.5*	48.1*	-13.2	1.9
Private for-profit less-than-4-year	55.4*	64.5	3.2	2.8
Gender				
Female	59.7	59.2*	3.6	1.6
Male	*55.0*	*55.6*	†	†
Race/ethnicity				
White, non-Hispanic	*58.6*	*57.4*	†	†
Black, non-Hispanic	47.5*	52.4*	-4.9	2.3
Hispanic	59.0	60.5	3.1	2.2
Asian/Pacific Islander	70.2	68.3*	11.0	3.7
American Indian/Alaskan Native	48.6	56.3	-1.1	9.3
Age in 1995–96				
18 years or younger	*63.7*	*58.9*	†	†
19	51.3	55.1	-3.8	2.7
20–23	38.8*	49.2*	-9.7	4.2
24–29	53.5	66.5	7.6	5.5
30 or older	42.6*	57.8	-1.2	5.5
Income in 1994				
Low quartile	52.5*	54.8*	-4.5	1.8
Middle quartiles	*60.6*	*59.3*	†	†
Parent's highest education				
High school or less	54.6	56.6	-2.9	2.0
Some postsecondary education	53.8	54.7*	-4.8	2.3
Bachelor's degree or equivalent	*61.0*	*59.4*	†	†
Advanced degree	73.9*	65.2*	5.7	2.9
High school completion				
Received high school diploma	*59.3*	*58.5*	†	†
Did not receive high school diploma[5]	39.2*	47.3*	-11.2	3.1

See footnotes at end of table.

Table 17.—Percentage of 1995–96 full-time, low- and middle-income beginning postsecondary students who remained enrolled continuously at the same or a higher level institution in 1998, and the adjusted percentage after taking into account the covariation of the variables in the table—Continued

Student characteristics	Unadjusted percentage[1]	Adjusted percentage[2]	Least squares coefficient[3]	Standard error[4]
Delayed enrollment				
Did not delay	*63.1*	*59.7*	†	†
Delayed	45.1*	52.4*	-7.3	3.2
Employment status				
Did not work	*61.2*	*59.1*	†	†
Worked part-time	62.6	59.0	-0.1	1.7
Worked full-time	45.0*	49.1*	-10.0	2.5
Dependency status				
Dependent	*60.9*	*58.4*	†	†
Independent	44.5*	54.4	-4.0	3.7
Have dependents other than spouse				
No dependents	*59.7*	*58.2*	†	†
One or more dependents	43.3*	53.6	-4.6	5.5
Single parent status				
Not a single parent	*59.0*	*57.2*	†	†
Single parent	44.6*	62.2	5.0	5.3

*$p \leq .05$.

†Not applicable for the reference group.

[1]The estimates are from the BPS:96/98 Data Analysis System.

[2]The percentages are adjusted for differences associated with other variables in the table (see appendix B). R^2=0.085.

[3]Least squares coefficient, multiplied by 100 to reflect percentage (see appendix B).

[4]Standard error of least squares coefficient, adjusted for design effect, multiplied by 100 to reflect percentage (see appendix B).

[5]Includes General Education Development (GED) and high school equivalency exams.

NOTE: The italicized group in each category is the reference group being compared. Low- and middle-income students include all dependent students whose parents had annual incomes in 1994 of less than $70,000 and all independent students who, in combination with their spouse's earnings, had annual incomes in 1994 of less than $25,000.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

less-than-4-year institutions and less likely to be enrolled in 4-year institutions (see table 2). Students in less-than-4-year institutions are less likely to persist than their counterparts in 4-year institutions (Berkner, Horn, and Clune 2000). However, after adjusting for the covariation among the independent variables in the regression model including institution type, the analysis detected no differences between Pell Grant recipients and nonrecipients in their rates of remaining enrolled.

Other variables also were associated with persistence prior to the multivariate analysis but were not associated after controlling for covariation of the variables in the table. These include being age 30 or older versus age 18 or younger, enrollment in private for-profit, less-than-4-year institutions versus public 4-year institutions, financial independence versus dependence, having dependents other than one's spouse versus no dependents, and being a single parent versus not being a single parent.

The multiple regression analysis revealed that some variables continued to be associated with lower persistence rates relative to the comparison group, both before and after controlling for background variation. These include being Black, non-Hispanic versus White, non-Hispanic; being 20–23 years old versus 18 or younger; having an income in the lowest quartile versus the middle quartiles; attending a public 2-year institution versus a public 4-year institution; not receiving a high school diploma versus having received one; delaying enrollment versus enrolling immediately after high school; and working full-time versus not working. All of these factors continued to be related to persistence after controlling for covariance of the other variables in the table.

Two factors that were associated with higher persistence rates relative to the comparison group before controlling for background variation remained so even afterwards. These include having a parent or parents with an advanced degree versus a bachelor's degree and attending a private not-for-profit 4-year institution versus a public 4-year college or university.

A few factors that were not originally associated with persistence were later found to be related after adjusting for the covariation of the independent variables in the model. For example, no difference was detected between unadjusted percentages for men and women. However, after controlling for background variation, females were more likely than males to remain enrolled at an institution at the same or higher level. Also, Asian and Pacific Islanders were found to have higher rates of persistence than that of Whites after controlling for related variables but not before. Although it appeared as if there was a difference between the unadjusted percentages, there was not enough statistical evidence to conclude that Asian/Pacific Islanders persisted at a higher rate than White, non-Hispanics before controlling for other variables (70 percent versus 59 percent). Finally, with respect to parents' highest level of education, no difference was detected in the unadjusted persistence rates between those with a parent who had achieved some postsecondary education and those who had a parent with a bachelor's degree (54 percent versus 61 percent). However, after controlling for the covariation of related variables, students who had a parent with a bachelor's degree persisted at a higher rate than those whose parents had completed only some postsecondary education.

Conclusions

This report described the postsecondary experiences of first-time postsecondary students who received Pell Grants and also addressed how beginning Pell Grant recipients differed from other beginning students in terms of academic and enrollment characteristics and three-year rates of persistence and attainment. First and foremost, because Pell Grant recipients qualify for need-based financial aid, they have demonstrated that they are financially needy. Financial need in itself places students at a disadvantage when compared with middle- and high-income students—especially high-income students who are more likely to succeed in postsecondary education. Income, therefore, was controlled to some extent in this study by excluding high-income students when analyzing differences between Pell Grant recipients and nonrecipients with respect to their academic preparation and postsecondary outcomes. Even so, low- and middle-income Pell Grant recipients were more disadvantaged than their nonrecipient counterparts in other ways related to persistence: they were more likely to have children, to be single parents, to be financially independent, not to have received a high school diploma, and to have delayed their postsecondary enrollment. Pell Grant recipients also were less likely to have SAT I/ACT composite scores that were in the highest quartile or to have taken a rigorous course curriculum while in high school.

Although Pell Grant recipients who began their postsecondary studies in 1995–96 were at a comparative disadvantage in many ways and were less prepared academically than other beginning students, few differences in their rates of persistence were detected when compared to the persistence of nonrecipients. While some differences in the likelihood of remaining enrolled at the same or higher level institution were found between Pell Grant recipients and nonrecipients attending private not-for-profit 4-year institutions, no such differences were found among those enrolled at public 4-year institutions, public 2-year institutions, or private for-profit, less-than-4-year institutions.

Finally, it appears that Pell Grant recipients have a more difficult time remaining enrolled at private not-for-profit 4-year institutions and private for-profit less-than-4-year institutions if they do not also receive some loan assistance. Among beginning Pell Grant recipients enrolled at private institutions, those who did not also take on a student loan persisted at lower rates than those who did.

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Appendix A—Glossary

This glossary describes the variables used in this report. The variables were taken directly from the 1995–96 Beginning Postsecondary Students Longitudinal Study (BPS:96/98) First Follow-up Data Analysis System (DAS), an NCES software application that generates tables from the BPS:96/98 data. A description of the DAS software can be found in appendix B.

In the index below, the variables are organized by general topic and, within topic, listed in the order in which they appear in the report. The glossary is in alphabetical order by variable label (displayed in capital letters to the right of the name).

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Worked while enrolled 1995–96 ..... J1HOURY1
Delayed postsecondary enrollment ..... ENDELAY
Attendance status when began at first institution ..... ENINFM
First persistence track exit type through 1998 ..... PRFLTYB1

Applied for financial aid 1995–96 **AHAPLYY1**

Student response to the question "Did you apply for financial aid for [ACADEMIC YEAR]?"

No
Yes

Attendance intensity first term enrolled 1995 **ATTEND2**

Indicates the student's attendance status during the fall or during the first month enrolled after October. Excludes students enrolled during summer 1995. This analysis looks at students who attended full time.

Overall rigor of high school curriculum **CTAKING**

Overall rigor of student's high school curriculum. For this analysis, the responses were aggregated into the following categories:

Core curriculum or lower	Core curriculum includes 4 years of English, 3 years of social studies, 3 years of mathematics, and 3 years of science.
Mid-level	Mid-level curriculum includes the Core curriculum requirements and also requires 1 year of a foreign language, geometry, and algebra 1, and 2 of the following classes: biology, chemistry, or physics.
Rigorous	Rigorous curriculum includes 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 Advanced Placement (AP) class or test taken.

Degree goal at first institution **DGEXPY1**

Highest degree expected at the first institution attended in 1995–96. Responses for any degree of BA/BS or higher, plus those planning to transfer to a 4-year institution were coded as bachelor's/transfer. Those planning no degree at that institution or planning to transfer from one less-than-4-year institution to another were also coded as having no degree expectation. Responses of higher degrees than were offered at the institution were assumed to be planning to transfer.

None
Certificate
Associate's degree
Bachelor's degree or transfer to 4-year

Delayed postsecondary enrollment **ENDELAY**

Indicates whether respondents delayed enrollment in postsecondary education, as determined by receipt of high school diploma before 1995 or reaching age 20 before December 31, 1995. This analysis looks at respondents who delayed enrollment.

Attendance status when began at first institution **ENINFM**

Indicates the intensity of first month enrolled 1995–98. Based primarily on institutional records. This analysis looks at respondents who were enrolled part time as a risk factor.

Attendance intensity through 1998 **ENIPTTB1**

Pattern of enrollment intensity during months enrolled at all institutions through June 1998. Attendance pattern refers to the student's full-time, part-time, or mixed attendance while enrolled.

Always full-time	Students were enrolled full time for all months enrolled through 1998.
Always part-time	Students were enrolled exclusively part time during enrolled months.
Mixed	Students were enrolled both full time and part time or had some other pattern of enrollment during enrolled months.

High school diploma or equivalency status **HSDIPLOM**

Indicates type of high school degree reported by the sample institution or, if not available, by the student. If student-reported information was used, it was collected from the CATI and in response to the question "Did you receive a high school diploma, pass a General Educational Development (GED) test, or receive a high school completion certificate?"

Students who attended foreign high schools were coded as receiving a high school completion certificate.

High school diploma
GED or high school equivalent
Did not graduate from high school

Type of initial institution **ITCARCT3**

Identifies the first institution attended by respondent, by selectivity within control and 1994 Carnegie classification. The Carnegie classification system includes all colleges and universities in the United States that are degree granting and accredited by an agency recognized by the U.S. Secretary of Education. In this study, selective institutions were identified as Carnegie classifications in which the average SAT scores of beginning students exceeded 1000 or in which a majority of students were enrolled in very selective institutions (institutions in which 75 percent of students scored 1000 or higher on the SAT exam as identified in the Common Data Set[18]). The classifications differ for public and private not-for-profit institutions (see table below for details).

[18]The Common Data Set is an institutional data collection sponsored by a collaboration of The College Board, Peterson's, *U.S. News & World Report*, and Wintergreen/Orchard House. Fall 1997 rather than fall 1996 data were used because more institutions participated and provided more complete responses in the latter year. Although there is a 2-year interval between the college entry of BPS:96/98 freshmen and fall 1997 institutional data, any change in an institution's admission test score distribution would have been unlikely to have affected its selectivity classification for this study.

Public selective	Research University I and II, and Baccalaureate I
Public less-selective	All other public 4-year institutions
Private not-for-profit selective	Research University I and II, Doctoral University I and II, and Baccalaureate I
Private not-for-profit less-selective	All other private not-for-profit 4-year institutions

Carnegie Classifications meeting selective criteria* (in bold)

	Derived SAT combined score for full-time 4-year students	Percent of students in very selective institutions		Derived SAT combined score for full-time 4-year students	Percent of students in very selective institutions
	Public institutions			Private not-for-profit institutions	
Total	937	23.6		986	33.1
Carnegie classification					
Research I and II	**1,025**	49.3	**Research I and II**	**1,154**	**92.1**
Doctoral I	935	13.5	**Doctoral I**	**1,022**	**59.7**
Doctoral II	871	13.3	**Doctoral II**	**1,042**	**65.1**
Comprehensive	854	1.7	Comprehensive	930	18.1
Baccalaureate I	995	**100.0**	**Baccalaureate I**	**1,094**	47.3
Baccalaureate II	834	0.0	Baccalaureate II	848	0.0
All others	803	0.0	All others	873	0.0

*Average SAT score of beginning students was over 1000 or a majority of students were enrolled in very selective institutions (25th percentile of SAT score 1000 or higher).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:96/98).

Family income and dependency 1994 (quartiles) **INCOME3**

Total income in 1994 by dependency. Categories approximately represent income quartiles for dependents and independents. For dependent students, total income is the income of the parents.

Dependent: Less than $25,000
Dependent: $25,000–44,999
Dependent: $45,000–69,999
Dependent: $70,000 or more
Independent: Less than $6,000
Independent: $6,000–14,999
Independent: $15,000–24,999
Independent: $25,000 or more

Type of first institution **ITNPSAS**

Level and control of the first institution attended.

Public 4-year
Private not-for-profit 4-year
Public 2-year
For-profit less-than-4-year

Worked while enrolled 1995–96 **J1HOURY1**

Indicates the average hours the student worked per week while enrolled during 1995–96, based on the student's report of average hours worked per week while enrolled during 1995–96. Full-time work is defined as working 35 or more hours per week.

Did not work
Worked part time
Worked full time

Parent's highest level of education **PBEDHI3**

Aggregated educational level of parent with greater educational attainment, as reported by the parent respondent or the student, if no parent CATI was obtained. Reflects editing of father's or mother's education based on father's or mother's occupation, where occupational and educational levels were discrepant.

High school diploma or less
Some postsecondary education
Bachelor's degree
Advanced degree

Package with Pell grants 1995–96 **PELLPACK**

Indicates the types of packages with Pell Grants received during 1995–96. For this analysis, the responses were aggregated into the following categories:

Pell Grant recipient
Nonrecipient who received other aid
Nonrecipient who did not receive aid

Pell grant total 1995–96 **PLAMT96**

Total federal Pell grant amount received at all institutions attended in 1995–96. This analysis looks at the average amount received.

Pell cumulative amount through 1998 **PLCUM98**

Sum of federal Pell grant amounts received in 1995–96, 1996–97, and 1997–98. This analysis looks at the average of the sums.

Pell grants number of years through 1998 **PLNUM98**

Number of academic years the student received Pell grants from 1995–96 through 1997–98. This analysis looks at the average number of years.

First persistence track exit type through 1998 **PRFLTYB1**

Identifies the type of first departure from the persistence track through June 1998. For this analysis, the responses were aggregated into the following categories:

Remained enrolled at same or higher level institution
Stopped out or transferred to lower level institution
Left postsecondary education without a degree

Parents provided loan or contribution 1995–96 **PSANYHY1**

Parents did not provide financial support
Parents provided financial support

Age during first month enrolled **SBAGFM**

Respondent's age, calculated from date of birth and first month enrolled, on the first day of the first month enrolled in postsecondary education.

18 years or younger
19 years
20–23 years
24–29 years
30 years or older

Dependency status when began at first institution **SBDEP1Y1**

Student dependency status in 1995–96. Students were considered independent if

1. Student was 24 years old or older as of 12/31/1995;
2. Student was a veteran of the U.S. Armed Forces;
3. Student was married;
4. Student was an orphan or ward of the court;
5. Student had legal dependents other than spouse; or
6. Student could document self-sufficiency or lack of parental support.

Dependent
Independent

Number of children when first enrolled **SBDPNY1**

Number of dependent children of respondent in 1995. This analysis looks at respondents who had children.

Gender **SBGENDER**

Student gender based on student- or institution-reported gender.

Male
Female

Marital status and children when first enrolled **SBMRCHY1**

Marital status, dependency, and whether respondent had dependent children in 1995.

Single, no children (dependent)	
Single, no children (independent)	
Single with children	
Married	Includes students who were married with no children and married with children.

Race/ethnicity **SBRACECI**

White, non-Hispanic	A person having origins in any of the original people of Europe, North Africa, or the Middle East (except those of Hispanic origin).
Black, non-Hispanic	A person having origins in any of the black racial groups of Africa, not of Hispanic origin.
Hispanic	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
Asian/Pacific Islander	A person having origins in any of the peoples of the Far East, Southeast Asia, the Indian subcontinent, or Pacific Islands. This includes people from China, Japan, Korea, the Philippine Islands, Samoa, India, and Vietnam.
American Indian/Alaska Native	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.
Other	A person not in one of the above categories.

Number of risk factors **SBRSK1Y1**

Represents an index of risk from 0–7 related to seven characteristics known to adversely affect persistence and attainment. Characteristics include delayed enrollment, no high school diploma (including GED recipients), part-time enrollment, financial independence, having dependents other than spouse, single parent status, and working full time while enrolled (35 hours or more). This analysis looks at the average number of risk factors.

Single parent 1995–96 **SBSINGY1**

Indicates whether student had dependents and was not married during 1995–96. This analysis looks at respondents who were single parents.

Dependent family income in 1994 **SFINDP94**

Total income of parents of dependent student during the 1994 calendar year. Categories represent family income quartiles of beginning dependent students.

Less than $25,000
$25,000–44,999
$45,000–69,999
$70,000 or greater

Income of independent student 1994 **SFININ94**

Total income for independent students (and spouse) during 1994 calendar. Categories represent beginning independent student income quartiles.

Less than $6,000
$6,000–14,999
$15,000–24,999
$25,000 or greater

Derived SAT combined score **TESATDER**

Student's Scholastic Assessment Test (SAT I Reasoning Test) combined score, which is either the sum of SAT verbal and mathematics scores or the ACT Assessment (American College Testing program) composite score converted to an estimated SAT combined score using a concordance table.[19] Constructed from agency-reported, institution-reported, or student-reported SAT or ACT scores in the following order of precedence (with corresponding percentages of beginning postsecondary students):

1. Agency-reported (ETS) SAT verbal and math scores (30%);
2. Agency-reported (ACT) ACT composite scores (22%);
3. Institution-reported (CADE) SAT verbal and math scores (2%);
4. Institution-reported (CADE) ACT composite scores (1%);
5. Student-reported (CATI) SAT verbal and math scores (1%);
6. Student-reported (CATI) ACT composite scores (1%).

All SAT scores are provided in original (not recentered) scale. Applies to cases having any reported ACT composite score or SAT verbal and mathematics scores (56 percent of all beginning postsecondary students and 95 percent of those beginning at 4-year institutions). For this analysis, the scores were aggregated according to the lowest, two middle, and highest quartiles in the BPS sample.

Lowest quartile (400–700)
Middle quartiles (710–1020)
High quartile (1030–1600)

[19]G. Marco, A. Abdel-Fattah, and B. Barton. *Methods Used to Establish Score Comparability on the Enhanced ACT Assessment and the SAT* (College Board Report 92–3) (New York: College Entrance Examination Board, 1992).

Total nonfederal grants 1995–96 **TNFEDGRT**

Indicates the total amount of nonfederal grants received during 1995–96. This analysis looks at the percentage of respondents who received nonfederal grants.

Total aid 1995–96 **TOTAID**

Indicates the total amount of financial aid received by a student in 1995–96. Includes grants, loans, or work-study, as well as loans under the PLUS program. This analysis looks at the percentage of respondents who received any aid.

Total loan (except PLUS) 1995–96 **TOTLOAN**

Indicates the total amount of loan aid received by a student in 1995–96. This includes all loans through federal, state, or institutional programs except PLUS loans (which are made to parents). Loans are a type of student financial aid that advances funds and that are evidenced by a promissory note requiring the recipient to repay the specified amounts under prescribed conditions. This analysis looks at the percentage of respondents who received loans.

Total work-study 1995–96 **TOTWKST**

Indicates the total amount of all work-study awards received during 1995–96. This analysis looks at the percentage of respondents who received work-study awards.

Appendix B—Technical Notes and Methodology

The Beginning Postsecondary Students Longitudinal Study (BPS:96/98)

The Beginning Postsecondary Students Longitudinal Study (BPS) includes students who participated in the 1995–96 National Postsecondary Student Aid Study (NPSAS:96) and were enrolled in postsecondary education for the first time in 1995–96. The National Postsecondary Student Aid Study (NPSAS) is a comprehensive nationwide study conducted by the U.S. Department of Education's National Center for Education Statistics (NCES) to determine how students and their families pay for postsecondary education.[20] It also describes demographic and other characteristics of students enrolled. The study is based on a nationally representative sample of all students in postsecondary education institutions, including undergraduate, graduate, and first-professional students. For NPSAS:96, information was obtained from more than 830 postsecondary institutions on approximately 44,500 undergraduate, 8,700 graduate, and 2,500 first-professional students. They represented about 16.7 million undergraduates, 2.4 million graduate students, and 300,000 first-professional students who were enrolled at some time between July 1, 1995 and June 30, 1996.

The BPS sample consists of approximately 12,000 students identified in NPSAS:96 as beginning postsecondary education for the first time. Unlike other NCES longitudinal surveys (such as High School and Beyond), which are based on age-specific cohorts, the BPS sample is more likely to include "nontraditional" postsecondary students, such as those who have delayed their education due to financial need or family responsibilities. The First Follow-up of the BPS cohort (BPS:96/98) was conducted in the spring and summer of 1998, approximately three years after these students first enrolled. Approximately 10,300 of the students who first began in 1995–96 were located and interviewed in the First Follow-up. The weighted effective response rate in the 1998 follow-up of NPSAS:96 for BPS-eligible respondents was 85.9 percent. The overall weighted response rate (including those who were nonrespondents in NPSAS:96) for the BPS:96/98 First Follow-up was 79.8 percent.[21]

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[20]For more information on the NPSAS survey, consult U.S. Department of Education, National Center for Education Statistics, *Methodology Report for the 1995–96 National Postsecondary Student Aid Study* (NCES 98–073) (Washington, DC: 1997). Additional information is also available at the NPSAS Web site: http://nces.ed.gov/npsas.

[21]For more information on the BPS:96/98 survey, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study First Follow-up 1996–98, Methodology Report* (NCES 2000–157) (Washington, DC: 2000).

The BPS:96/98 Data Analysis System (DAS) includes sample weights for cross-sectional analysis of the students in 1995–96 (B98IAWT) and longitudinal analysis of the sample through 1998 (B98AWT). All of the tables and estimates in this report used the longitudinal analysis weight.

Accuracy of Estimates

The statistics in this report are estimates derived from a sample. Two broad categories of error occur in such estimates: sampling and nonsampling errors. Sampling errors occur because observations are made only on samples of students, not entire populations. Nonsampling errors occur not only in sample surveys but also in censuses of entire populations. Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all students in all institutions in the sample (some students or institutions refused to participate, or students participated but answered only certain items); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, sampling, and imputing missing data.

Data Analysis System

The estimates presented in this report were produced using the BPS:96/98 Data Analysis Systems (DAS). The DAS software allows users to specify and generate tables from the BPS:96/98 data. With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates proper standard errors[22] and weighted sample sizes for these estimates. For example, table B1 contains estimated standard errors for the estimates provided in table 12 and was generated by the DAS. If the number of valid cases is too small to produce a reliable estimate, the DAS prints the message "low-N" instead of the estimate.

[22]The BPS:96/98 samples are not simple random samples, and therefore simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. The method for computing sampling errors used by the DAS involves approximating the estimator by the linear terms of a Taylor series expansion. The procedure is typically referred to as the Taylor series method.

Table B1.—Standard errors for table 1a: Percentage distribution of all 1995–96 beginning postsecondary students according to receipt of Pell Grant, by first institution type and attendance status

First institution type	Pell recipients	Nonrecipients		
		Received other aid	Did not receive aid	Total
		Total		
Total*	0.94	0.89	1.10	0.94
Public 4-year	1.01	1.19	1.17	1.01
Private not-for-profit 4-year	1.37	1.53	1.37	1.37
Public 2-year	1.79	1.58	2.06	1.79
Private for-profit less-than-4-year	2.64	2.13	2.24	2.64
		Full-time students		
Total*	1.03	1.00	1.03	1.03
Public 4-year	1.06	1.28	1.21	1.06
Private not-for-profit 4-year	1.44	1.59	1.38	1.44
Public 2-year	2.61	2.31	2.64	2.61
Private for-profit less-than-4-year	2.86	2.39	2.49	2.86

*Includes institutions listed here as well as public less-than-2-year institutions; private not-for-profit less-than-4-year institutions; and private for-profit 4-year institutions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996 Beginning Postsecondary Students Longitudinal Study, "First Follow-up" (BPS:96/98).

In addition to tables, the DAS can also produce a correlation matrix of selected variables to be used for linear regression models. Included in the output with the correlation matrix are the design effects (DEFTs) for each variable in the matrix. Since statistical procedures generally compute regression coefficients based on simple random sample assumptions, the standard errors must be adjusted with the design effects to take into account the BPS:96/98 sample design.

The DAS can be accessed electronically at http://nces.ed.gov/DAS. For more information about the BPS:96/98 Data Analysis System, contact:

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Statistical Procedures

Differences Between Means

The descriptive comparisons were tested in this report using Student's *t* statistic. Differences between estimates are tested against the probability of a Type I error,[23] or significance level. The significance levels were determined by calculating the Student's *t* values for the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing.

Student's *t* values may be computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}} \tag{1}$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. This formula is valid only for independent estimates. When estimates are not independent, a covariance term must be added to the formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2 - 2(r)se_1 se_2}} \tag{2}$$

where r is the correlation between the two estimates.[24] This formula is used when comparing two percentages from a distribution that adds to 100. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$t = \frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p\ se_{sub}^2}} \tag{3}$$

where p is the proportion of the total group contained in the subgroup.[25] The estimates, standard errors, and correlations can all be obtained from the DAS.

There are hazards in reporting statistical tests for each comparison. First, comparisons based on large *t* statistics may appear to merit special attention. This can be misleading since the

[23] A Type I error occurs when one concludes that a difference observed in a sample reflects a true difference in the population from which the sample was drawn, when no such difference is present.

[24] U.S. Department of Education, National Center for Education Statistics, *A Note from the Chief Statistician*, no. 2, 1993.

[25] Ibid.

magnitude of the *t* statistic is related not only to the observed differences in means or percentages but also to the number of students in the specific categories used for comparison. Hence, a small difference compared across a large number of students would produce a large *t* statistic.

A second hazard in reporting statistical tests for each comparison occurs when making multiple comparisons among categories of an independent variable. For example, when making paired comparisons among different levels of income, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison. When more than one difference between groups of related characteristics or "families" are tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together.

Comparisons were made in this report only when $p \leq .05/k$ for a particular pairwise comparison, where that comparison was one of k tests within a family. This guarantees both that the individual comparison would have $p \leq .05$ and that for k comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to $p \leq .05$.[26] For example, when comparing the percentages of males and females who enrolled in postsecondary education, only one comparison is possible (males versus females). In this family, $k=1$, and the comparison can be evaluated without adjusting the significance level. When students are divided into five racial/ethnic groups and all possible comparisons are made, then $k=10$ and the significance level of each test must be $p \leq .05/10$, or $p \leq .005$. The formula for calculating family size (k) is as follows:

$$k = \frac{j(j-1)}{2} \tag{4}$$

where j is the number of categories for the variable being tested. In the case of race/ethnicity, there are five racial/ethnic groups (American Indian/Alaska Native; Asian/Pacific Islander; Black, non-Hispanic; Hispanic; and White, non-Hispanic), so substituting 5 for j in equation 4,

$$k = \frac{5(5-1)}{2} = 10$$

[26]The standard that $p \leq .05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p \leq .05$. For tables showing the *t* statistic required to ensure that $p \leq .05/k$ for a particular family size and degrees of freedom, see Olive Jean Dunn, "Multiple Comparisons Among Means," *Journal of the American Statistical Association* 56 (1961): 52–64.

Bivariate Correlations

For the bivariate correlations reported in the report, the strength of the relationships between pairs of variables was provided using a scale of magnitudes. Following Cohen (1988),[27] reported magnitudes adopted the notion of a scale of small, moderate, and large sized relationships, qualitative terms that allow interpretation of the strength of a relationship through the concept of effect size. Cohen suggested that for a scale of the proportion of variance accounted for (the square of the correlation coefficient, r^2), one might use a value of 0.01 to signify a small effect size, 0.09 for moderate, and 0.25 for large. Some latitude is appropriate in determining the scale of effect sizes within the context of the analysis. The magnitudes reported in this report were based on a scale in which the effect is small if r^2 is less than 0.05, moderate if r^2 is at least 0.05 but less than 0.25, and large if r^2 is 0.25 or greater.

Adjustment of Means to Control for Covariation

Many of the independent variables included in the analyses in this report are related, and to some extent the pattern of differences found in the descriptive analyses reflect this covariation. For example, when examining the percentages of those who were still enrolled or who had completed a degree at their initial institution 3 years after beginning postsecondary education, it is possible that some of the observed relationship with high school academic curriculum is due to differences in other factors related to academic preparation, such as college admission test scores, type of institution attended, and so on. However, if nested tables were used to isolate the influence of these other factors, cell sizes would become too small to identify the significant differences in patterns. When the sample size becomes too small to support controls for another level of variation, one must use other methods to take such variation into account. The method used in this report estimates adjusted means with regression models, an approach sometimes referred to as communality analysis.

To obtain estimates that were adjusted for the covariation among the entire set of independent variables identified as significant in the descriptive analyses, a multiple linear regression[28] was used to regress the dependent variable on the full set of independent variables. Each independent variable is divided into several discrete categories. To find an estimated mean value on the dependent variable for each category of an independent variable, while adjusting for its covariation with other independent variables in the equation, substitute the following in the equa-

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[27]Cohen, Jacob. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd Edition. Hillsdale, NJ: Lawrence Erlbaum Associates.

[28]For more information about weighted least squares regression, see Michael S. Lewis-Beck, *Applied Regression: An Introduction*, Vol. 22 (Beverly Hills, CA: Sage Publications, Inc., 1980); William D. Berry and Stanley Feldman, *Multiple Regression in Practice*, Vol. 50 (Beverly Hills, CA: Sage Publications, Inc. 1987).

tion: (1) a one in the category's term in the equation, (2) zeroes for the other categories of this variable, and (3) the mean proportions for all other independent variables. This procedure holds the impact of all remaining independent variables constant, and differences between adjusted means of categories of an independent variable represent hypothetical groups that are balanced or proportionately equal on all other characteristics included in the model as independent variables.

For example, consider a hypothetical case in which two variables, age and gender, are used to describe an outcome, *Y* (such as the percentage of students who left their initial institution). The variables age and gender are recoded into a dummy variable representing age, *A*, and a dummy variable representing gender, *G*:

Age	*A*
24 years or older	1
Less than 24 years old	0
and	
Gender	*G*
Female	1
Male	0

The following regression equation is then estimated from the correlation matrix output from the DAS:

$$\hat{Y} = a + b_1 A + b_2 G \tag{5}$$

To estimate the adjusted mean for any subgroup evaluated at the mean of all other variables, one substitutes the appropriate values for that subgroup's dummy variables (1 or 0) and the mean for the dummy variable(s) representing all other subgroups. For example, suppose *Y* represents leaving the initial institution and is being described by age (*A*) and gender (*G*), coded as shown above. The unadjusted mean values of these two variables are as follows:

Variable	Mean
A	0.355
G	0.521

Next, suppose the regression equation results are as follows:

$$\hat{Y} = 0.15 + 0.17A + 0.01G \tag{6}$$

To estimate the adjusted value for older students, one substitutes the appropriate parameter estimates and variable values into equation 6.

Variable	Parameter	Value
a	0.15	—
A	0.17	1.000
G	0.01	0.521

This results in the following equation:

$$\hat{Y} = 0.15 + (0.17)(1) + (0.01)(0.521) = 0.325$$

In this case, the adjusted mean for older students is 0.325 and represents the expected outcome for older students who resemble the average student across the other variables (in this example, gender). In other words, the adjusted percentage who left the initial institution after controlling for age and gender, is 32.5 percent (0.325 x 100 for conversion to a percentage).

It is relatively straightforward to produce a multivariate model using the DAS since one of the DAS output options is a correlation matrix, computed using pairwise missing values. In regression analysis, there are several common approaches to the problem of missing data. The two simplest are pairwise deletion of missing data and listwise deletion of missing data. In pairwise deletion, each correlation is calculated using all of the cases for the two relevant variables. For example, suppose you have a regression analysis that uses variables X1, X2, and X3. The regression is based on the correlation matrix between X1, X2, and X3. In pairwise deletion, the correlation between X1 and X2 is based on the nonmissing cases for X1 and X2. Cases missing on either X1 or X2 would be excluded from the calculation of the correlation. In listwise deletion, the correlation between X1 and X2 would be based on the nonmissing values for X1, X2, and X3. That is, all of the cases with missing data on any of the three variables would be excluded from the analysis.[29]

The correlation matrix can be used by most statistical software packages as the input data for least squares regression. That is the approach used for this report, with an additional adjustment to incorporate the complex sample design into the statistical significance tests of the parameter estimates (described below). For tabular presentation, parameter estimates and standard

[29]Although the DAS simplifies the process of making regression models, it also limits the range of models. Analysts who wish to estimate probit/logit models (which are the most appropriate for models with categorical dependent variables) can apply for a restricted data license from NCES. See John H. Aldrich and Forrest D. Nelson, "Linear Probability, Logit and Probit Models," *Quantitative Applications in Social Sciences*, Vol. 45 (Beverly Hills, CA: Sage, 1984).

errors were multiplied by 100 to match the scale used for reporting unadjusted and adjusted percentages.

Most statistical software packages assume simple random sampling when computing standard errors of parameter estimates. Because of the complex sampling design used for the NPSAS survey, this assumption is incorrect. A better approximation of their standard errors is to multiply each standard error by the design effect associated with the dependent variable (DEFT),[30] where the DEFT is the ratio of the true standard error to the standard error computed under the assumption of simple random sampling. It is calculated by the DAS and produced with the correlation matrix.

[30]The adjustment procedure and its limitations are described in C.J. Skinner, D. Holt, and T.M.F. Smith, eds., *Analysis of Complex Surveys* (New York: John Wiley & Sons, 1989).

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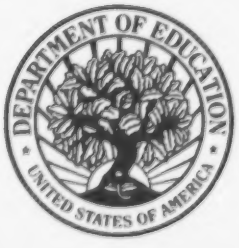

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